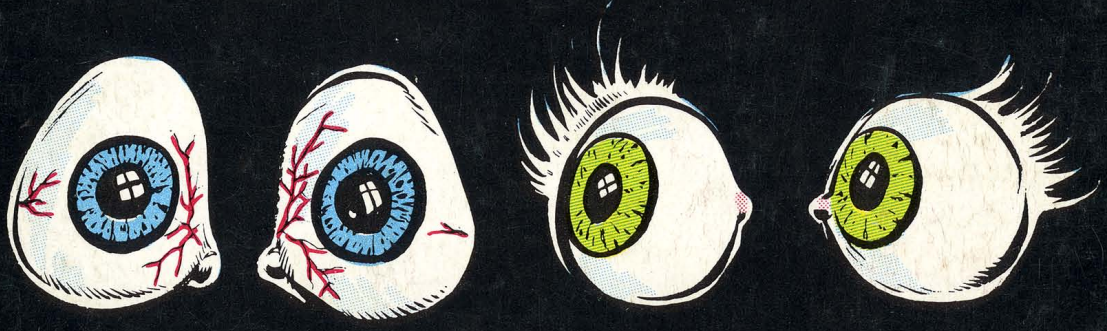
PS

THE PREVENTIVE MAINTENANCE MONTHLY

Issue 23 1954 Series



...WHEN DID YOU CHECK THAT GENERATOR?

HE'S ON YOUR TEAM,

In Preventive Maintenance there's a man who's sometimes forgotten.

He's part of the Preventive Maintenance team, though. A mighty important man. Here're the things he does to **help** you do your job better and keep the equipment rolling and shooting:

He's the man who gets the tools, parts, lubes, fuels and other items you want for your job.

He gets all the manuals, lube orders, copies of PS Magazine, and other publications you need to help you maintain your equipment.

He's the man who sees that you—and your buddies—get the training you need to operate and maintain your equipment so's it'll be in the best shape at all times.

He figures out the amount of time you'll need to keep your equipment maintained,

HE'S ON YOUR TEAM, TOO!

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He figures out the amount of time you'll need to keep your equipment maintained, and he makes sure you get that time in your training or work.

Last—but not least—he checks over your equipment to see that you're doing the Preventive Maintenance right and to see that your equipment is up to snuff and ready to fight.

Glad he's on your team? Y're darned right.

Who is he? Your CO, o'course.

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PS Magazine wants your ideas and contributions, and is glad to answer your questions. Just write: **Editor, PS Magazine, Aberdeen Proving Ground, Maryland.**

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THE COVER — Equipment'll lose its "oomph" and there'll be an end to mighty important activities when a goof-off forgets about Preventive Maintenance for his generator.

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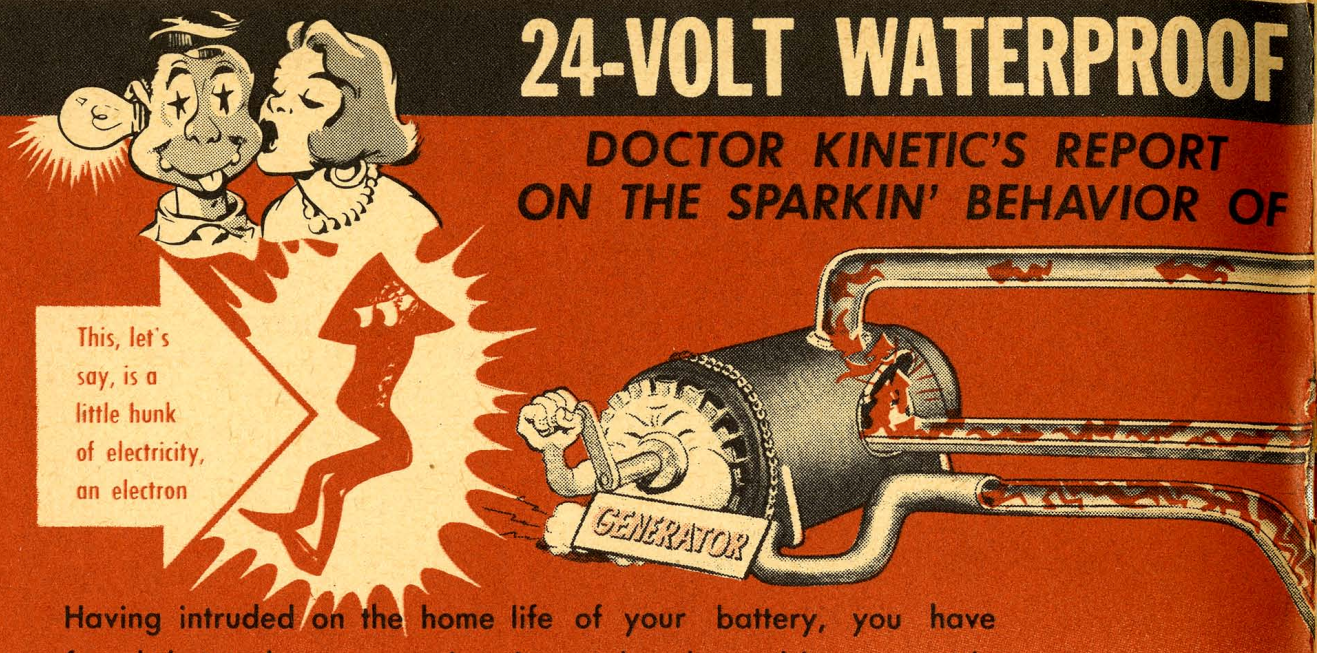
24-VOLT WATERPROOF

DOCTOR KINETIC'S REPORT ON THE SPARKIN' BEHAVIOR OF



Having intruded on the home life of your battery, you have found that to keep you going, it must be charged by an outside source of current. This source is your generator, so please to consider the manners and customs of the generator.

All generators as we know them today are machines which move wires, generally coiled on an armature, through the fields of magnets to produce electricity.

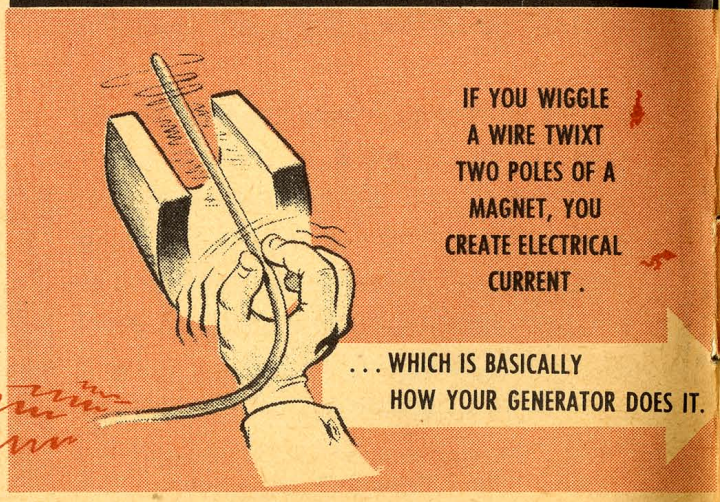
The commutator is that ring of bars on the end of the armature. Brushes ride on it and pick the current out of the moving armature so you can take it where you need it. A small electro-magnet or field coil gives the same results as a large heavy permanent magnet, so generators are made small enough to mount on vehicles to carry around.

To be useful on a truck, a generator must have a fairly even and controlled output. A generator used to operate only one lamp and set on a fixed base and driven by a constant speed engine would be no problem. When you have the right size generator running at the right speed, you'd be right.

THE CHANGING LOAD

But on your truck you have lots of different electrical loads—lights on, lights off, etc—and the engine turns at lots of different speeds—motor faster, more juice put out. So, you need either lots of different sizes of generator, or some other answer.

Here's How Current is Created Inside

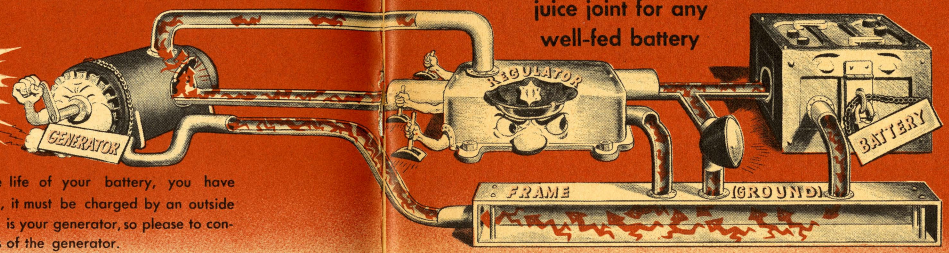


24-VOLT WATERPROOF ELECTRICAL SYSTEMS

DOCTOR KINETIC'S REPORT ON THE SPARKIN' BEHAVIOR OF GENERATORS

PART 2

juice joint for any well-fed battery



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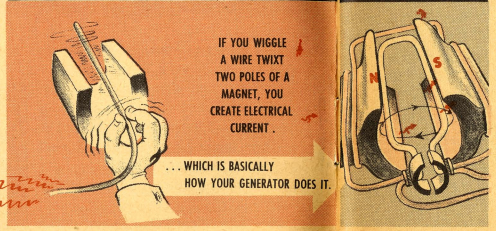


Since you can't carry a couple of dozen different generators around, you need some way to change the output of your one generator. Fortunately, one armature will work pretty well at different speeds and with different sizes of field magnets. Still, you can't be jumping out to change field magnets every ten seconds, so you need some way to change 'em automatically. The easiest way to change the effective size of your field magnets is to change the amperage they are carrying.

So, if you had some gismo which would put in different amounts of current to the field coils, it would have the same effect as changing the size of the field magnets, and would control the output of the generator. You have such a gismo—your generator regulator.

Flip your eye across the top of these pages and you'll see the regulator controlling the amount of current running back to the generator (field coils)—and the amount of current running back there, as the electrons are demonstrating, is controlling the generator output. In a word then, the regulator is just a 3-armed traffic cop that measures the traffic between the generator and the battery—then shoots the right amount of juice back to the generator to increase or decrease the output. More output needed, more juice sent along the feed-back—less current needed, less feed-back (field) current is sent.

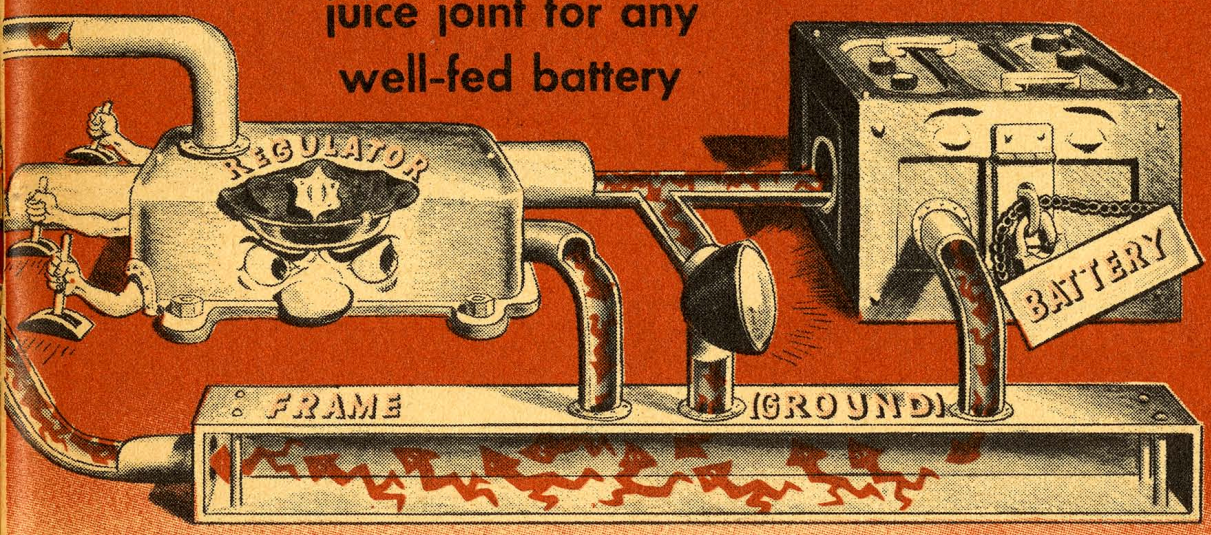
To understand the works of a generator regulator, you first must know what it has to do.

ELECTRICAL SYSTEMS

GENERATORS

PART 2

juice joint for any well-fed battery



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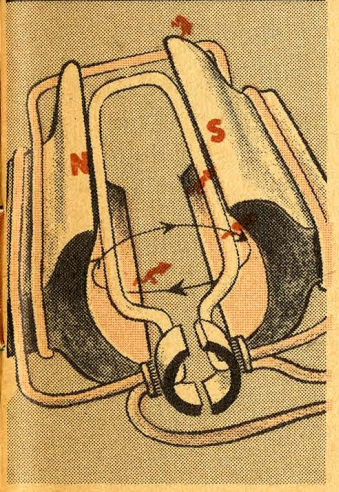
Your Generator



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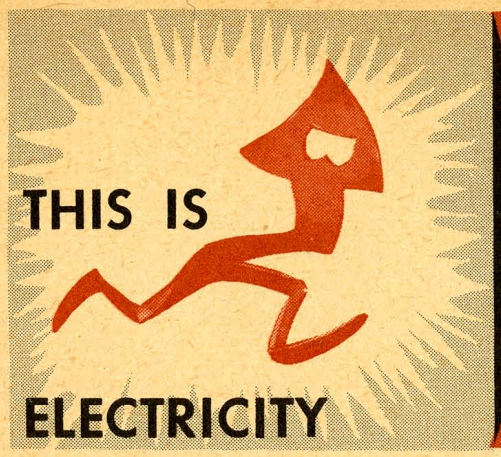
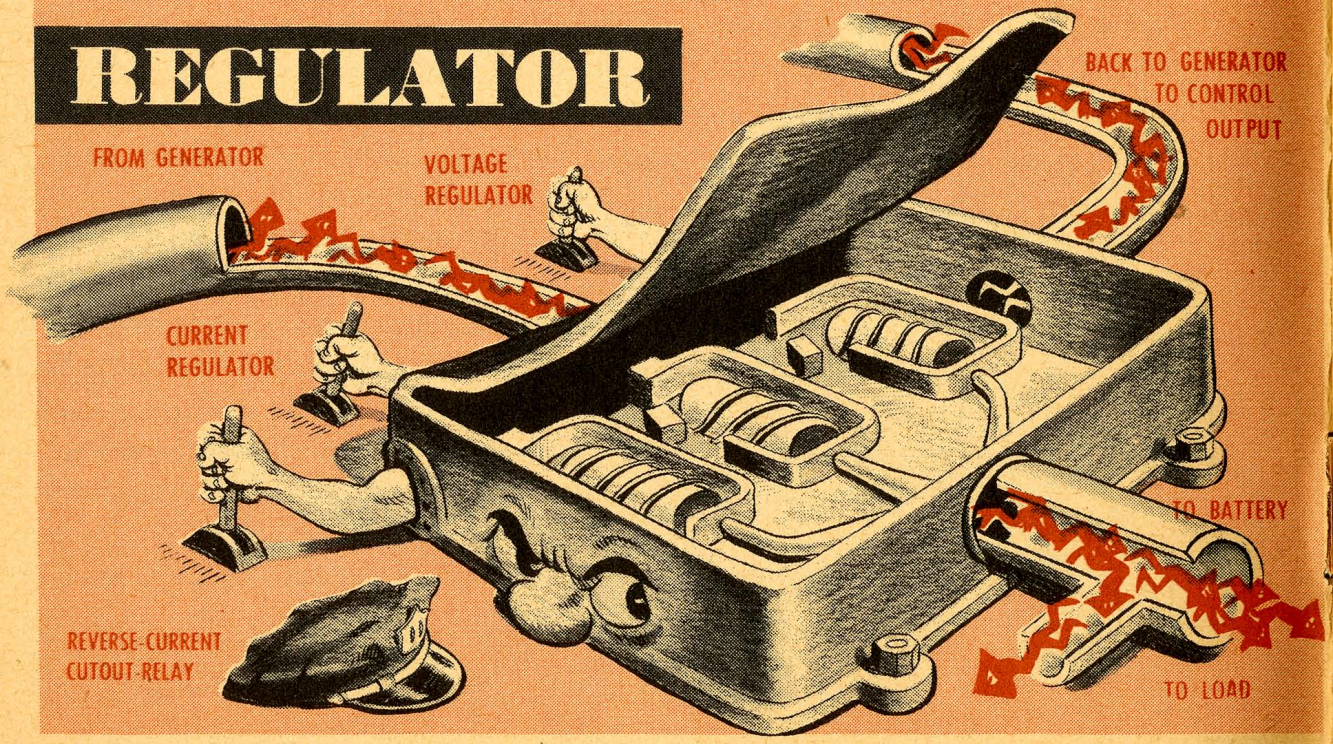


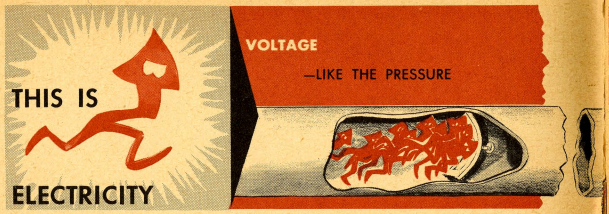
VOLTAGE

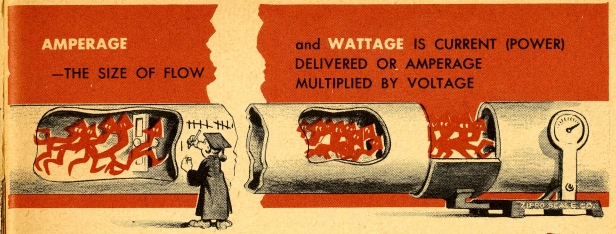
—LIKE THE PRESSURE

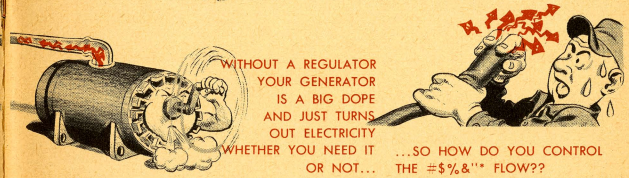
WHEN A LOTTA ELECTRONS GET TO GOIN' SOMEPLACE, ...THAT'S CURRENT... AND AS YOU KNOW, WIRES ARE WHAT THEY GO THRU...

WE RIG US A GIMMICK TO DO ALL THIS...









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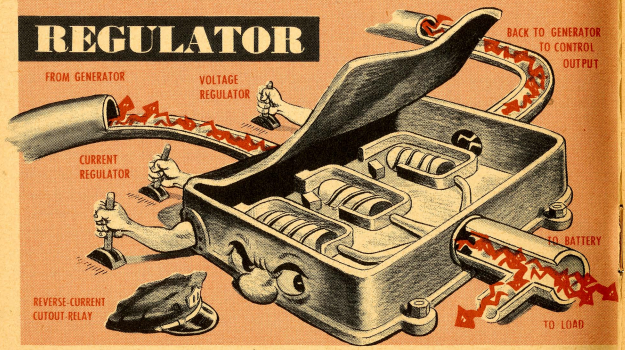


...AND CALL IT (NATCH) A REGULATOR...SEE?

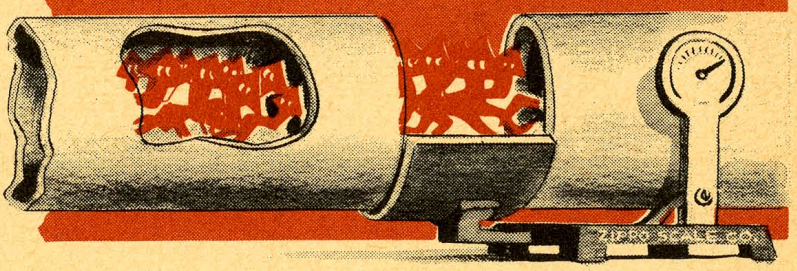
Normally, if the voltage of a generator's output is controlled, the resistance of the circuits and the batteries will be enough to keep the amperage down to safe limits. However, dead batteries, which have far less resistance, or heavy loads, or short circuits in the wiring can sometimes allow too large a current to flow even if the voltage is kept down. So you need a way to keep the amperage down to safe limits too.

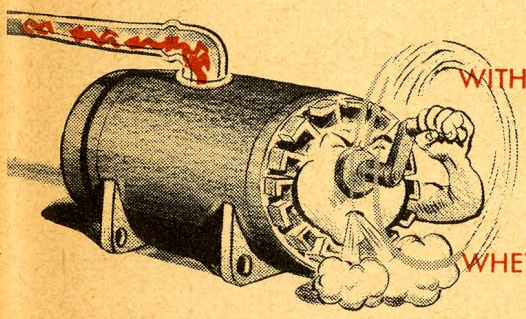
And since your battery current will run back through the generator when the generator is not turning, you need some sort of automatic switch to turn off the current when the engine is stopped or idling.

So your generator regulator must limit voltage and amperage, and stop reverse or backward currents. To do the job, it has a voltage regulator, a current regulator, and a reverse-current cutout-relay.

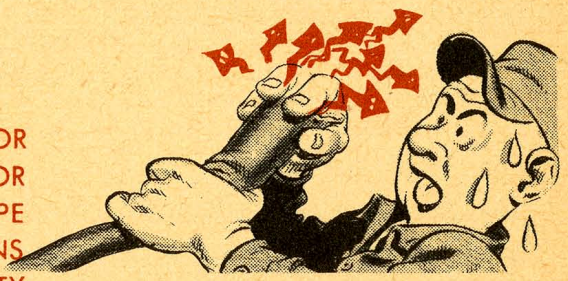
AMPERAGE
—THE SIZE OF FLOW

and **WATTAGE** IS CURRENT (POWER) DELIVERED OR AMPERAGE MULTIPLIED BY VOLTAGE





WITHOUT A REGULATOR YOUR GENERATOR IS A BIG DOPE AND JUST TURNS OUT ELECTRICITY WHETHER YOU NEED IT OR NOT...



...SO HOW DO YOU CONTROL THE #$%&''* FLOW??

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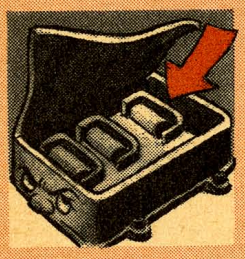
VOLTAGE REGULATOR

Consider the voltage and current controls. You can control the output of the generator by putting in a controlled current at the field lead.

This is a simple voltage regulator.

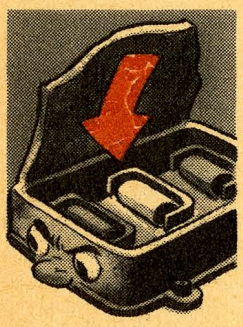


This regulator takes a little of the current from the generator and passes it through a carefully made coil, known as the "shunt coil" to the ground. The shunt coil is of very fine wire, and does not use much current, but it measures the voltage, and sets up a pull on the armature which gets stronger as the voltage increases. The armature spring is adjusted so that when the generator voltage gets too high, the contact points open.

You can see that when the contact points are closed, the field current flows from the generator across the regulator armature, through the contact points and back to the field coils through the field lead. When the points are open, this current must detour around by way of the resistor. This cuts down the generator field-current and so cuts down the generator voltage. Of course, the cut in voltage cuts the pull of the shunt coil, so the spring pulls the regulator armature back, closing the contact points, and the whole business starts over. The contact points vibrate 50 to 100 times per second to limit the voltage.

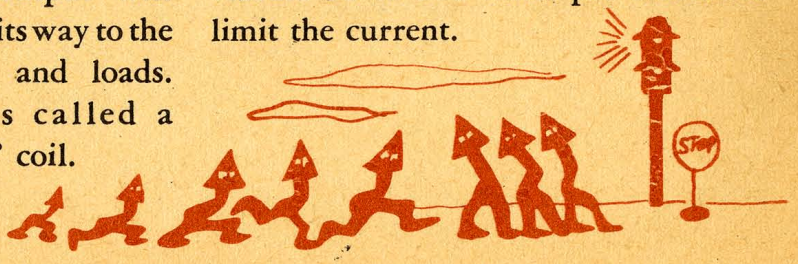
CURRENT REGULATOR

This is a simple current regulator. Remember that while the voltage regulator used a shunt coil across to the ground to measure the voltage (or pressure) the current was under, the current regulator wants to know how **much** current is flowing.



It has a heavy coil through which the entire output will pass on its way to the battery and loads. This is called a "series" coil.

The contact points on the regulator armature and the resistor serve the same purpose as on the voltage regulator. That is, when the current passing through the coil builds up enough magnetic pull to overcome the spring tension to pull the armature down, the points come open and the resistor cuts down the field current. The points vibrate 50 to 200 times per second to limit the current.



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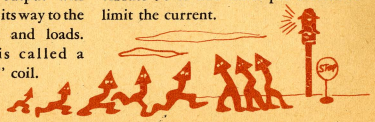

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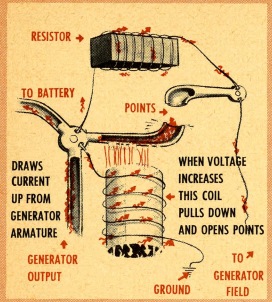

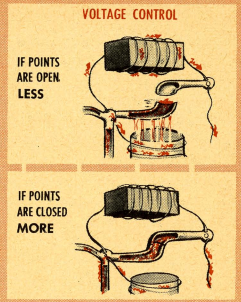

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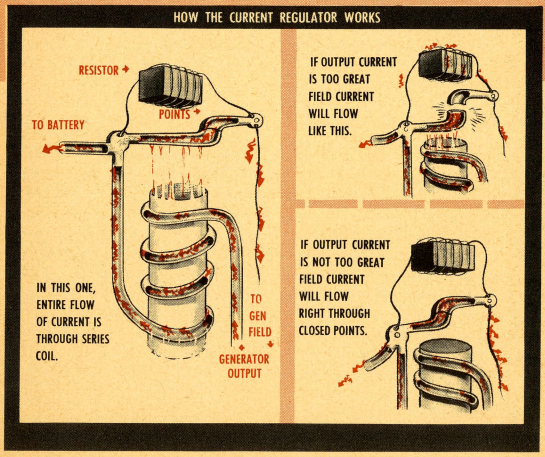

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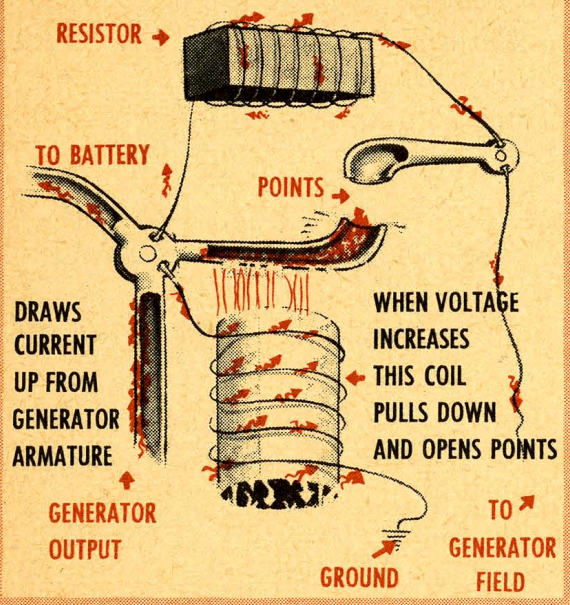
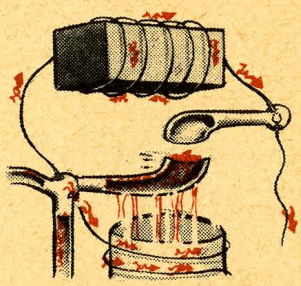
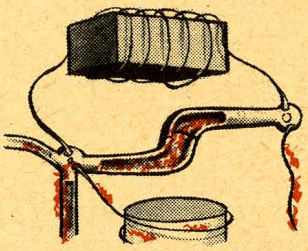


VOLTAGE CONTROL

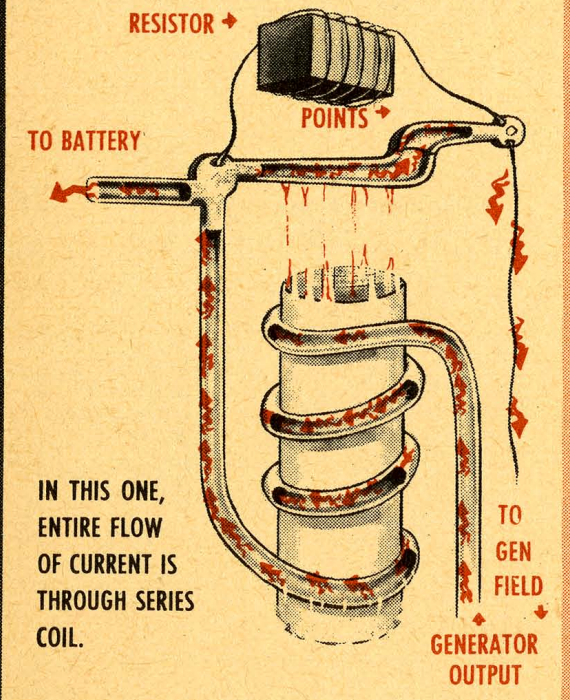
IF POINTS ARE OPEN **LESS**



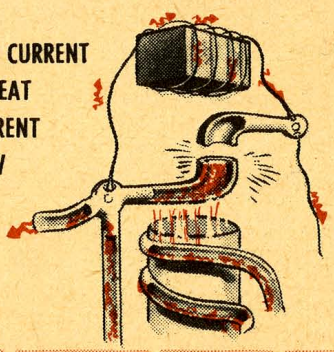
IF POINTS ARE CLOSED **MORE**



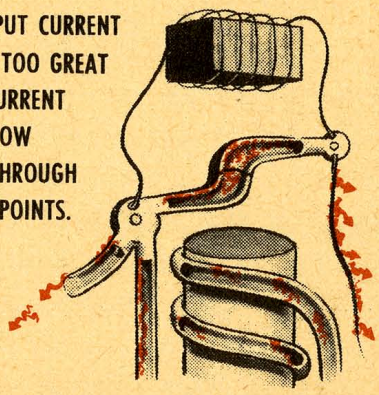
HOW THE CURRENT REGULATOR WORKS

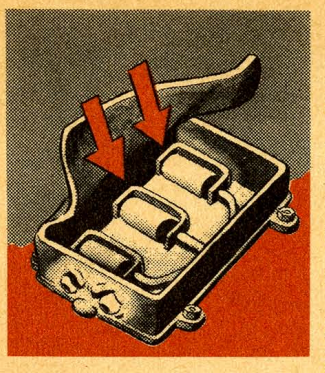


IF OUTPUT CURRENT IS TOO GREAT FIELD CURRENT WILL FLOW LIKE THIS.



IF OUTPUT CURRENT IS NOT TOO GREAT FIELD CURRENT WILL FLOW RIGHT THROUGH CLOSED POINTS.



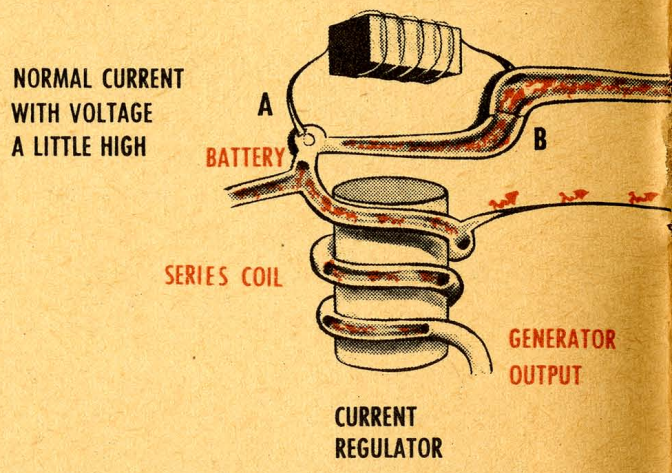


Now, let's hold it a moment and re-examine the current and voltage regulators just discussed. While either of these gismos will control its part of your generator's output, you can't just hook one of each on a generator and control both parts. This is because the right one wouldn't know what the left was doing, and while the voltage coil might be trying frantically to reduce the field current, the current coil would shrug its shoulders and say "Shucks, I'm all right —only a little current flowing here," and go on feeding full output current back to the field coils. As you can see, this would defeat the voltage coil, and result in uncontrolled generator output.

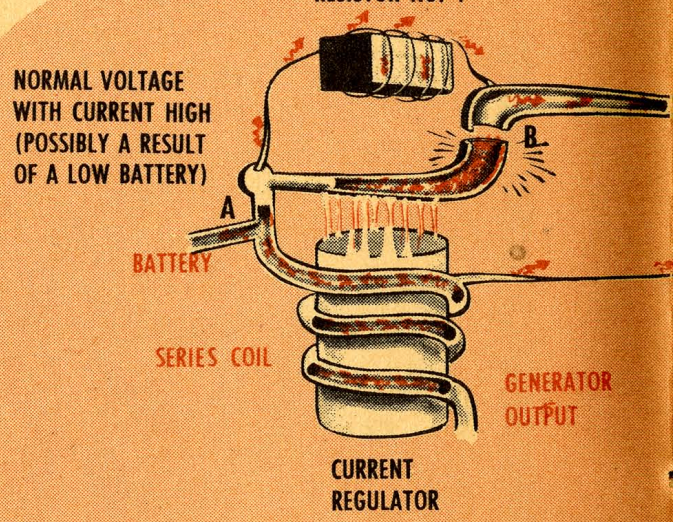
This, of course, wouldn't be good, so they check with each other —"I'm OK, how's it with you?"—to get the right amount of current fed back to the generator field coils.

At first glance the illustrations at right seem to be the pictures on page 7 side-by-side. But if you follow the path of the current from the generator armature lead back to the field lead, you will see that it goes from *A* to *B* to *C* to *D* and so back to the field lead. By coming over this way, with only one way back to the field coils, it must check the status of both regulators before it gets back to the generator. If either set of contacts is open, the field current will be reduced by that part of the regulator.

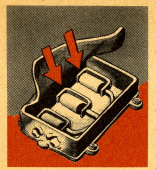
HERE'S HOW THEY TEAM UP



1 Consider first a normal current with the voltage a little high. Contact points *B* on the current regulator are closed, and does



2 Now consider a normal or low voltage, with a high current (possibly as the result of a low battery). Contact points *B* on the current regulator will be open, causing the current to go by way of resistor No. 1, while contact points



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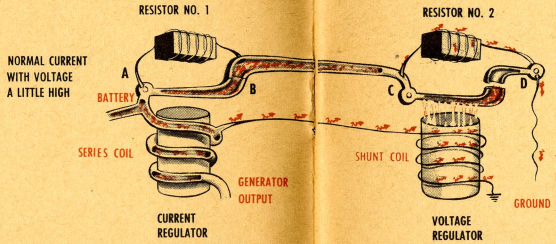
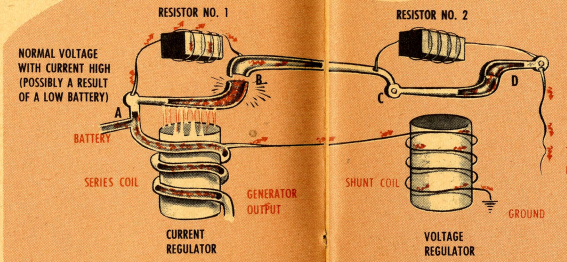
HERE'S HOW THEY TEAM UP UNDER DIFFERENT CONDITIONS

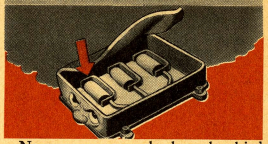


1 Consider first a normal current with the voltage a little high. Contact points *B* on the current regulator are closed, and does not go through resistor No. 1. Contact points *D* on the voltage regulator are open so the field current must pass through resistor No. 2.



2 Now consider a normal or low voltage, with a high current (possibly as the result of a low battery). Contact points *B* on the current regulator will be open, causing the current to go by way of resistor No. 1, while contact points *D* on the voltage regulator will be closed, by-passing the current around resistor No. 2 and back to the field lead. So, in this circuit, each type of regulator gets its say, and the proper field current is fed back to the generator.

REVERSE CURRENT CUTOUT - RELAY



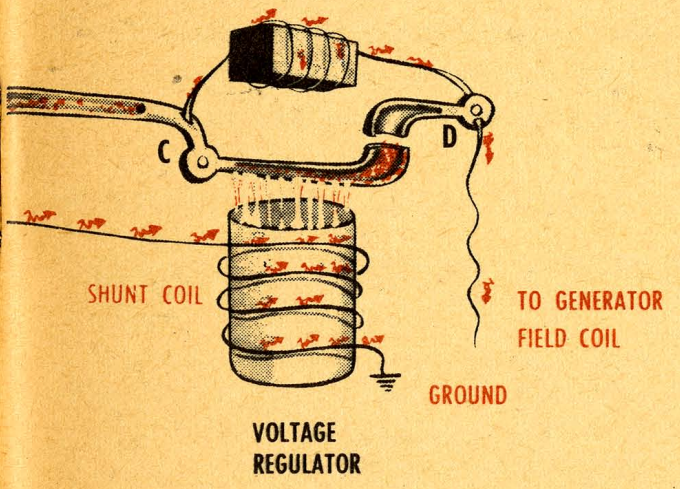
Now we can come back to the third use of the regulator: Turning the switch on when the generator commences charging, and turning it off again when the generator stops charging. You've gotta have this or the battery'd discharge itself through the generator when the engine stops.

In the reverse-current cutout-relay, current coming from the generator charges both coils as far as the contact points. But, until these points close, the only place it can flow is through the shunt coil from *A* to ground.

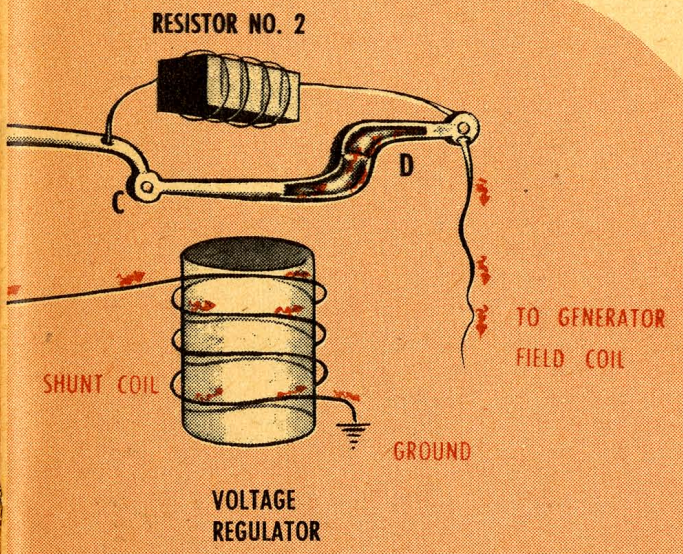
This shunt coil is wound and balanced with the armature spring so that the contacts won't close until the generator voltage is **above** the battery voltage, and **below** the regulator setting. When the points close, current also flows through the series coil, through the contact points to the battery and loads of the truck. It is still flowing through the shunt coil to ground.

To see how this switch turns off the generator when it is not charging, you must know a little about the nature of electro-magnets. Any coil of wire wound around a core will become an electro-magnet when a current of electricity is passed through it. As you know, every magnet has two poles, known as the

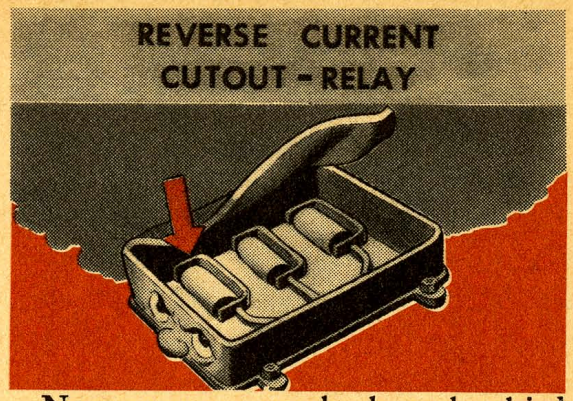
UNDER DIFFERENT CONDITIONS



not go through resistor No. 1. Contact points *D* on the voltage regulator are open so the field current must pass through resistor No. 2.



D on the voltage regulator will be closed, by-passing the current around resistor No. 2 and back to the field lead. So, in this circuit, each type of regulator gets its say, and the proper field current is fed back to the generator.



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North and South poles of the magnet. The direction in which the current in the coil circles the core determines which end of the coil will be the North pole.

You can see that current flowing through the shunt coil to ground will produce a South pole at the top of the core. You can also see that when the points close and permit the current to flow in the series coil from the generator to the battery, it, too, will have its South pole at the top of the core.

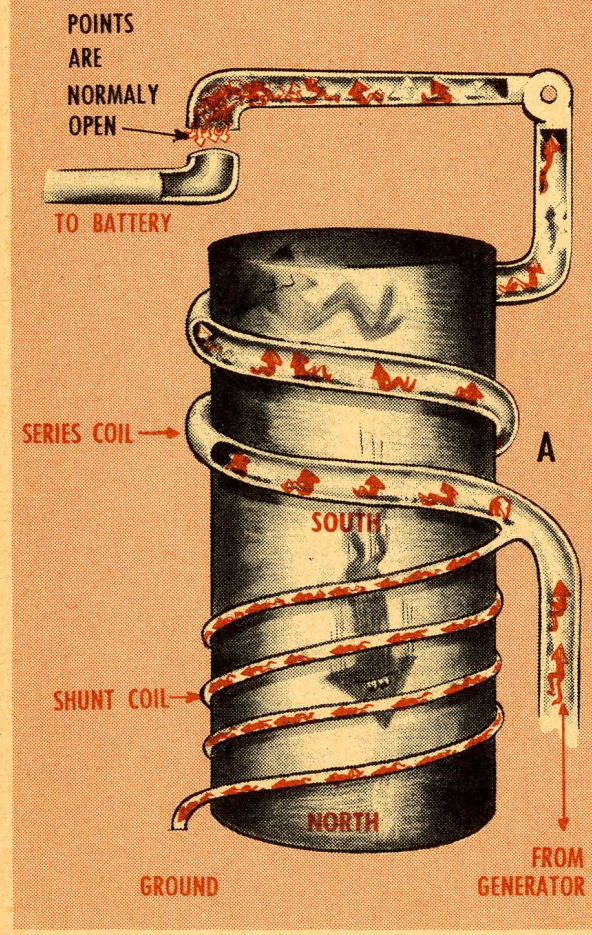
So, while the generator is charging, the currents through both of the coils are pulling together to make a strong South pole at the top of the core and hold the contact points firmly together.

But, when the generator stops charging, the current from the battery flows back through the series coil and the generator to ground. Reversing the current

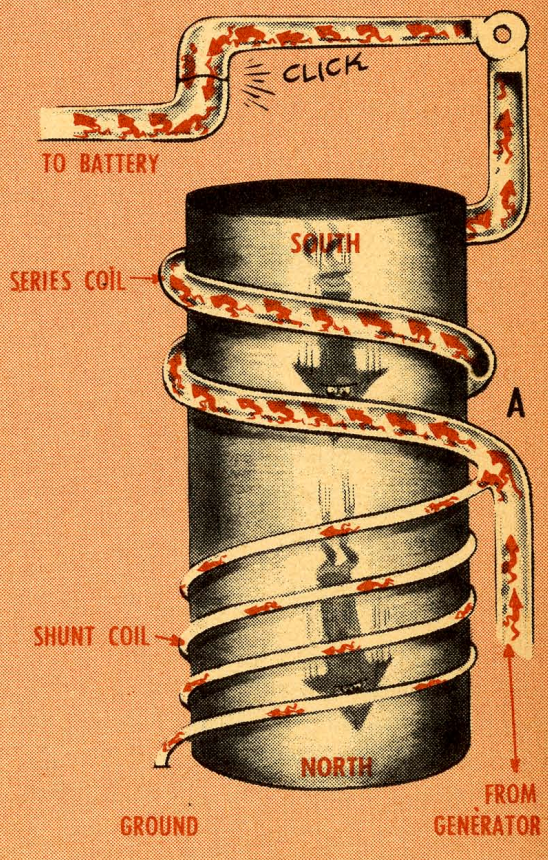
HERE'S HOW THE REVERSE

1 WHEN GENERATOR BEGINS TO CHARGE **2**

BOTTOM WINDING NOW EXERTS MAGNETIC PULL TO CLOSE POINTS.



WHEN THE CURRENT GETS STRONG ENOUGH AND POINTS ARE PULLED SHUT . . . BOTH WINDINGS EXERT A MAGNETIC PULL IN THE **SAME** DIRECTION HOLDING 'EM CLOSED.



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So, while the generator is charging, the currents through both of the coils are pulling together to make a strong South pole at the top of the core and hold the contact points firmly together.

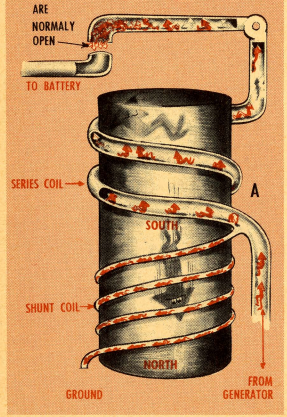
But, when the generator stops charging, the current from the battery flows back through the series coil and the generator to ground. Reversing the current in the series coil reverses the magnetic polarity of this coil. Its top pole is now North. At the same time, some of the current is still passing through the shunt coil from *A* to ground. So the top pole of the shunt coil is still South. So you see, the two coils are now working against each other and the armature spring opens the contact points, disconnecting the generator from the battery.

The thing to remember here is that no matter which direction the current is flowing in the series coil and heavy leads, it always flows from point *A* to ground through the shunt coil, so the shunt coil always has the same pole at the top. (This relay would work just as well if both North poles were up a forward current. The trick is to get the coils bucking each other on the reverse current.)

HERE'S HOW THE REVERSE CURRENT CUT-OUT RELAY WORKS

1 WHEN GENERATOR BEGINS TO CHARGE

BOTTOM WINDING NOW EXERTS MAGNETIC PULL TO CLOSE POINTS.



2

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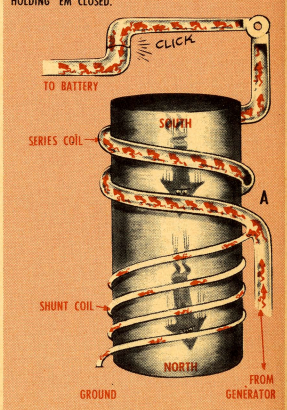
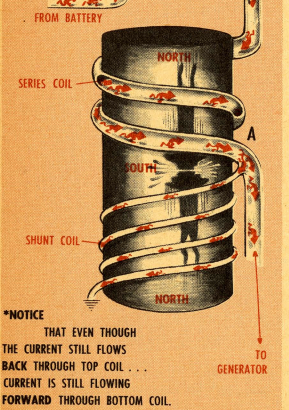


3 WHEN GENERATOR STOPS CHARGING

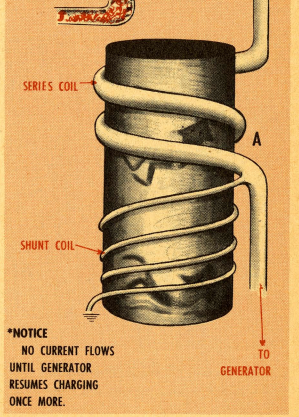
CURRENT FLOWS BACK FROM BATTERY TO GENERATOR.



***NOTICE**
THAT EVEN THOUGH THE CURRENT STILL FLOWS **BACK** THROUGH TOP COIL . . . CURRENT IS STILL FLOWING **FORWARD** THROUGH BOTTOM COIL.

4

THUS CANCELLING OUT MAGNETIC POLES . . . AND THE POINTS OPEN UP ONCE MORE.



***NOTICE**
NO CURRENT FLOWS UNTIL GENERATOR RESUMES CHARGING ONCE MORE.

in the series coil reverses the magnetic polarity of this coil. Its top pole is now North. At the same time, some of the current is still passing through the shunt coil from *A* to ground. So the top pole of the shunt coil is still South. So you see, the two coils are now working against each other and the armature spring opens the contact points, disconnecting the generator from the battery.

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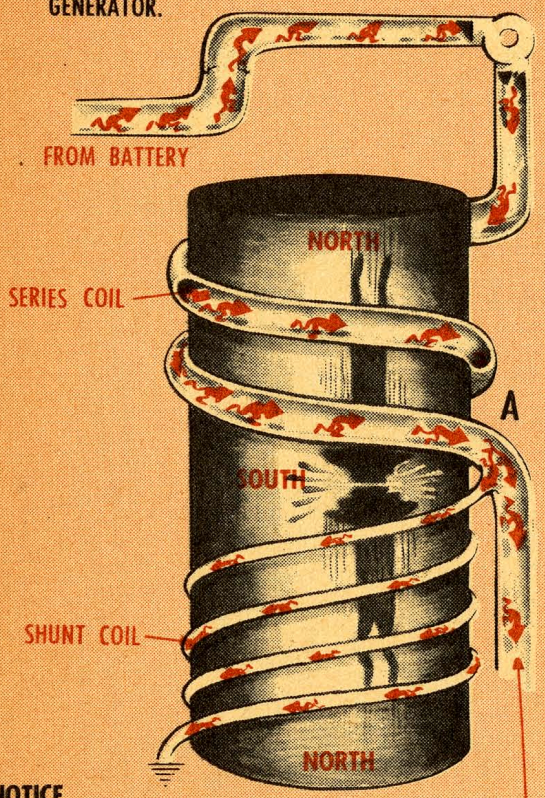
CURRENT CUT-OUT RELAY WORKS

WHEN GENERATOR STOPS CHARGING

3

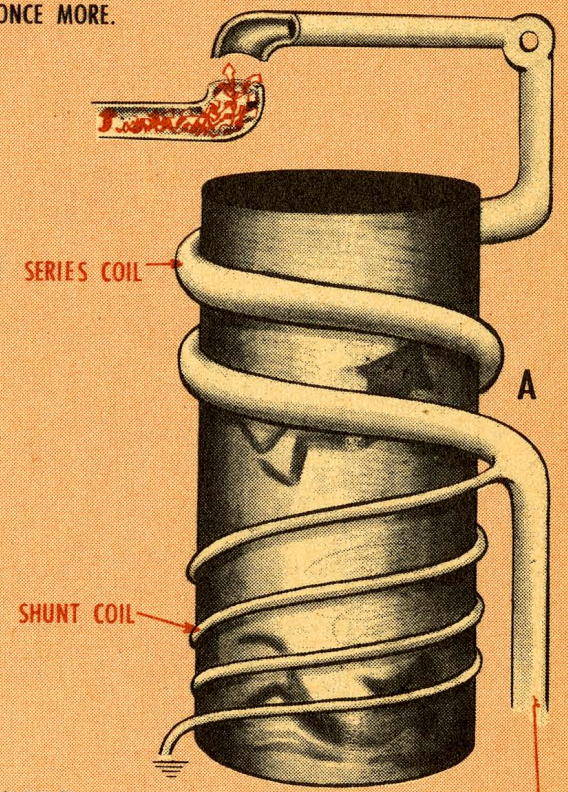
CURRENT FLOWS BACK FROM BATTERY TO GENERATOR.



*NOTICE THAT EVEN THOUGH THE CURRENT STILL FLOWS BACK THROUGH TOP COIL . . . CURRENT IS STILL FLOWING FORWARD THROUGH BOTTOM COIL.

4

THUS CANCELLING OUT MAGNETIC POLES . . . AND THE POINTS OPEN UP ONCE MORE.



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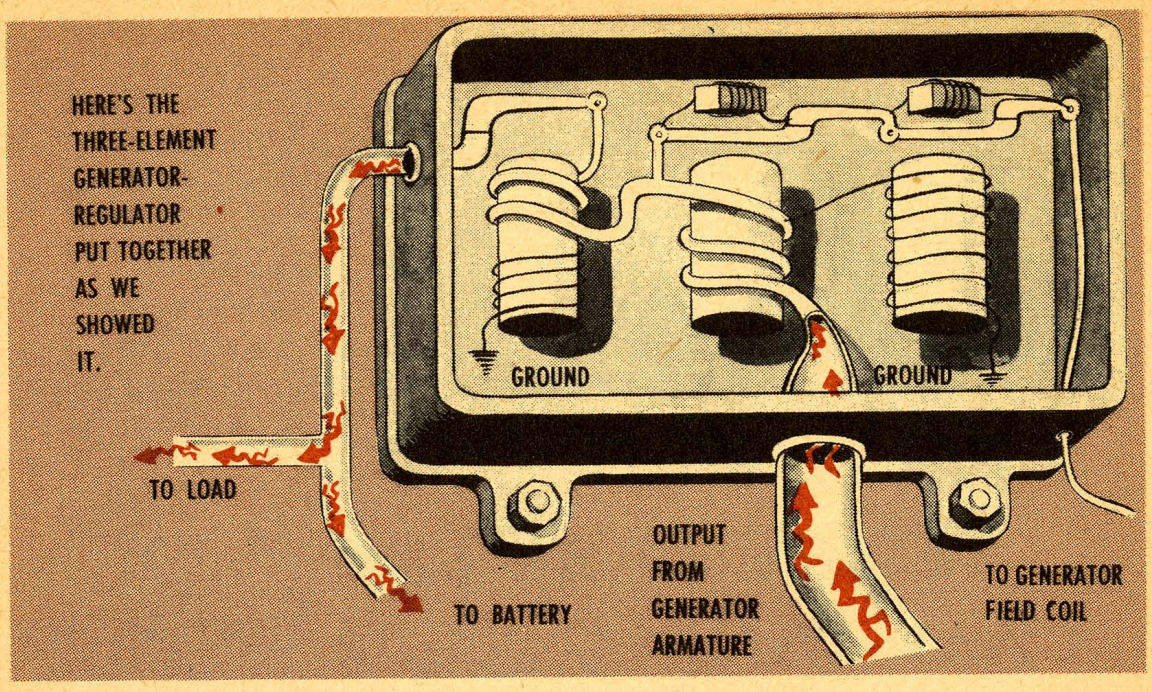
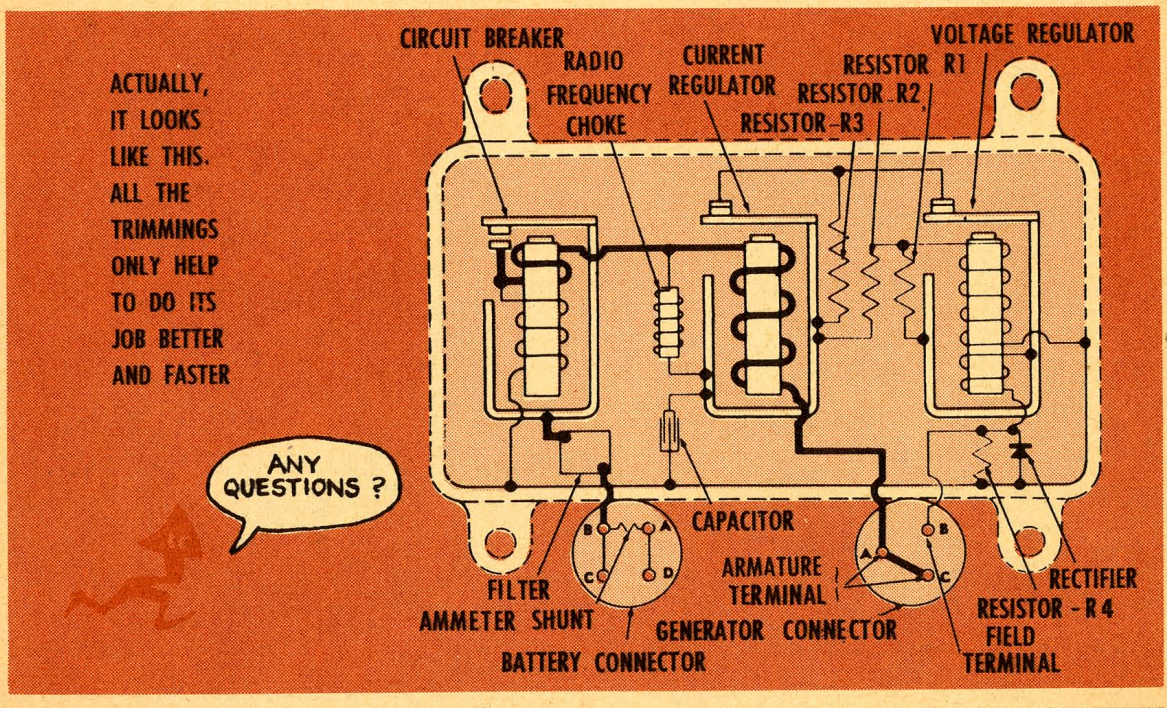


It has the voltage regulator working through a shunt coil to measure and limit current; and the current regulator using a series coil to measure and limit current; and the reverse-current cutout to connect the generator onto the line as it comes up to charging voltage, off the line when it falls below charging voltage.



Remember that this article tells you about what goes on in your generator and regulator so you'll know how to use and maintain 'em better. But you'll have to keep out of that regulator. You're not authorized to break its seal.

A-TISKET, A-GASKET

Dear Half-Mast,

Every TM on the medium tank series says when removing a spark plug for servicing, always install a new gasket when you put it back. This I admit, is sound thinking, but where in the blazes do we get the new gaskets?

Nowhere, but nowhere can they be found in the SNL's—no, I take that back—there is a gasket listed in Ord 7 SNL G-254 for the auxiliary engine's spark plug. I thought I was smart and requisitioned it because it's the same plug used in the main engine. But what do I get? The **folded-***copper type, the kind used for liquid-cooled engines.*

Some people put the folded-type in the main engine, but all good engine mechanics know air-cooled engines are to use only solid-copper gaskets. This is very important because the solid-copper type is made for severe service and if the correct gasket isn't used, the engine will run hotter than it should.

Sgt A. C. M.

Dear Sgt A. C. M.,

You said a mouthful, pal, and you know it's true. A solid flush beats two-of-a-kind any day—and a flush solid-copper gasket is the best of the two kinds you get for those 14-mm aviation-type plugs in air-cooled engines.

You couldn't find the solid-type in the SNL's because it isn't listed in the SNL's. But your letter (and a couple more like it) got the supply situation on those gaskets straightened out like it never was before—fast, too.

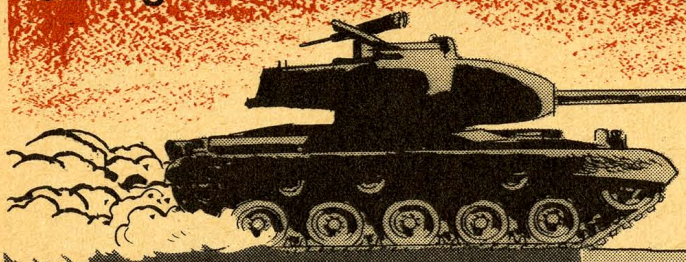
Now you can requisition those solid-copper gaskets for spares: **Ord Stock No. G104-1593805** (Ord Part No. 296665).

Another thing about these solid-type gaskets, they can be used over and over unless they're bent like a pretzel or are so out-of-round you can't slip 'em on the plug. So it's smart to keep a gasket with a plug—sorta matched up. Then if you should get the folded-type gaskets on some replacement plugs, take a swap—send the folded-type gaskets back with the old plugs and keep the old solid-type gaskets for new plugs.

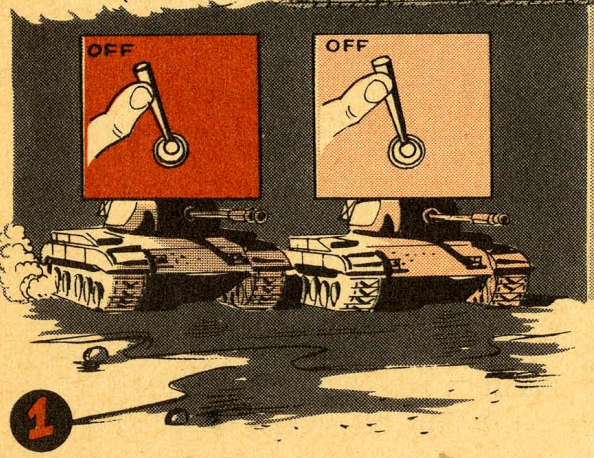
The TM that calls for new gaskets is talking about the folded-type — they can't be used over again.

Half-Mast

Calling all tankers with the latest word on . . .

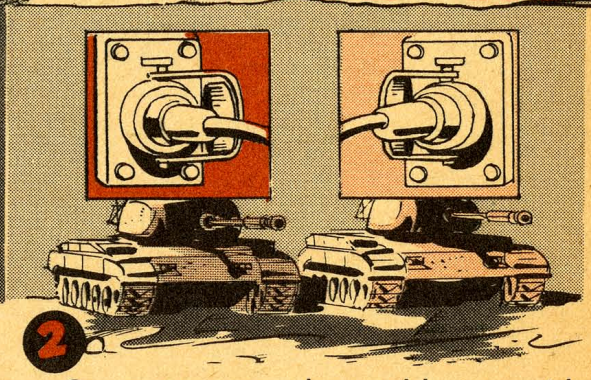


SLAVE-CABLE



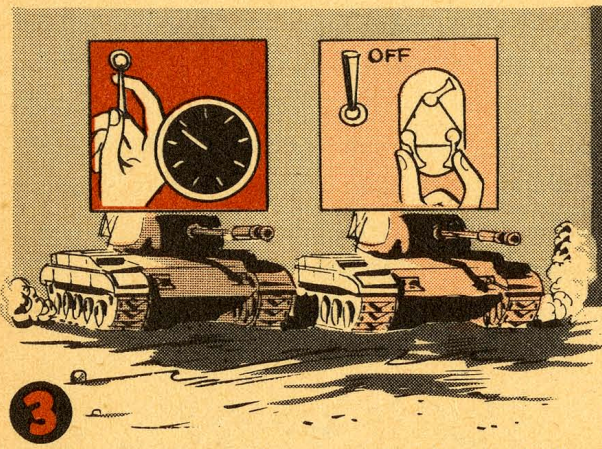
1

Drive your live tank up close to your dead tank and stop it. Turn the master-relay switch **off** in both tanks.



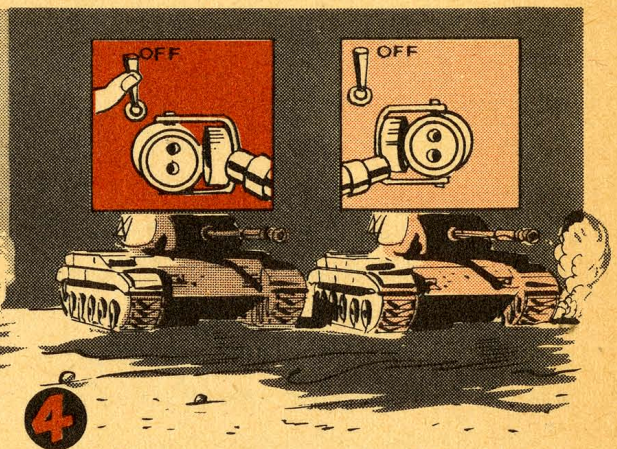
2

Connect up your slave cables—providing no shorts exist in dead tank. (See PS #7, page 272 for cautions on these cables. If you don't have a copy—write to Half-Mast.)



3

Now, turn **on** the master-relay switch in the live tank and start your engine. Set your engine speed to about 1400-RPM—with master-relay switch in dead tank **off**. Start the dead tank's main engine. Your starter and other accessories will work OK with the relay **off** using current from the live tank.

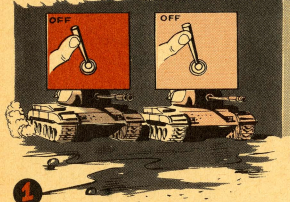


4

Next, stop the engine in your "live-helper" tank and turn **off** its master-relay switch. Disconnect your slave cable. Always be sure your relays are **off** when connecting or disconnecting this cable. You can get a nasty arc and a big fire if you touch those prongs to any metal. They're shielded, but why take chances?

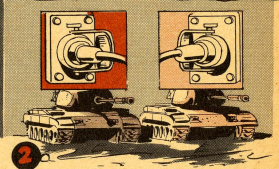
Calling all tankers with the latest word on . . .

SLAVE-CABLE STARTING



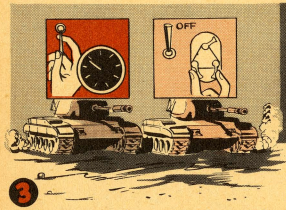
1

Drive your live tank up close to your dead tank and stop it. Turn the master-relay switch **off** in both tanks.



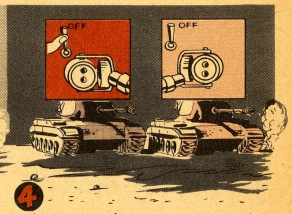
2

Connect up your slave cables—providing no shorts exist in dead tank. (See PS #7, page 272 for cautions on these cables. If you don't have a copy—write to Half-Mast.)



3

Now, turn **on** the master-relay switch in the live tank and start your engine. Set your engine speed to about 1400-RPM—with master-relay switch in dead tank **off**. Start the dead tank's main engine. Your starter and other accessories will work OK with the relay **off** using current from the live tank.



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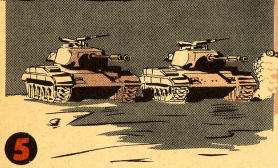
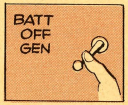


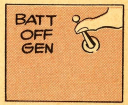
5

When the cable is removed, turn **on** the master-relay switch in the tank that was dead to let the generator charge the batteries. Keep the time between turning the live-helper tank **off** and turning the "revived" tank **on** as short as you can. Yank that cable promptly and switch the revived tank **on**. It isn't good for the engine to be running with no battery in the circuit.

6

You now start the helper tank in the normal manner and drive it away. That's all. **Note:** Some M46's have a 3-position master-relay switch and you turn the dead tank switch to **Gen** and let it run until at least 18½ volts are available from the batteries to hold the relay closed—then switch to **on**.





This whole procedure will work with the Cadillac light tanks with one exception. The gun, twin 40-mm, self-propelled M42 has its master-relay **between** the slave-cable receptacle and the rest of the circuits. So, unless the master-relay control-switch is **on** and the relay is closed, you can't get your outside current to the starter. This means that to start the M42 you gotta have that master-relay switch in the **dead** tank **on** as well as the one in the live tank. So keep in mind, in the M42 both switches gotta be **on**.

(TB Ord 537, Sept 53, gives you this latest word on the matter for medium tanks.)

STARTING

5

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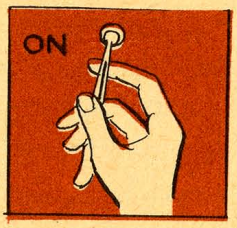

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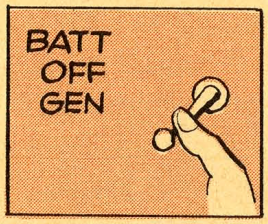

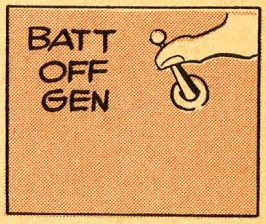

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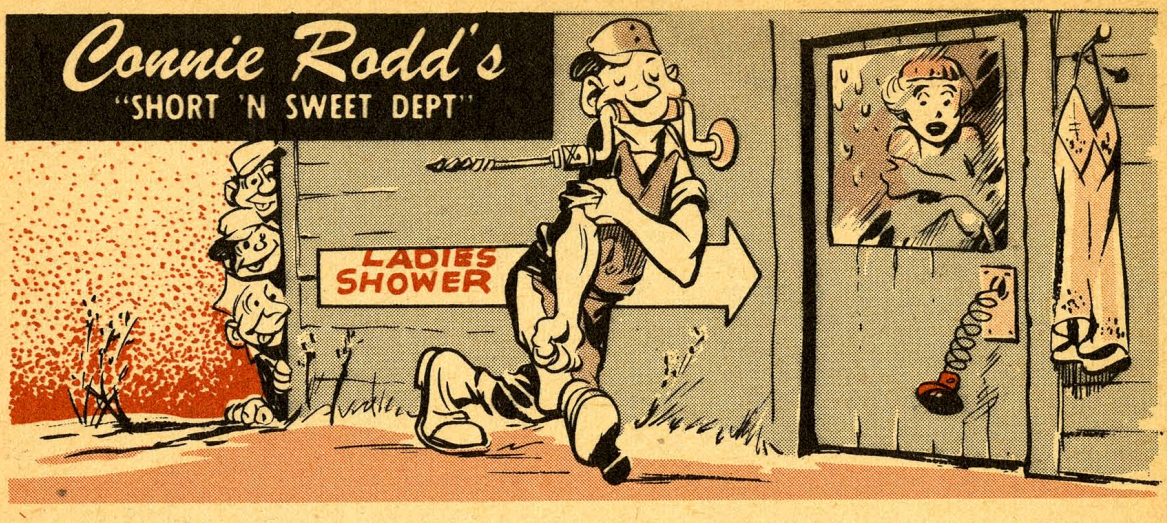
(TB Ord 537, Sept 53, gives you this latest word on the matter for medium tanks.)



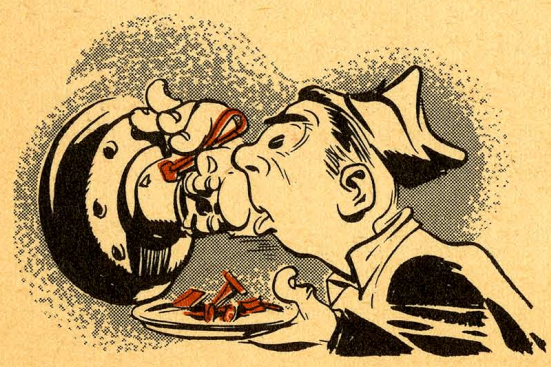
Flubbed hubs

When you get that slick new M101 trailer, give a close look at the contract number. You'll find it on the combination nameplate on front of the vehicle.

If it's Contract No. DA-20-113-Ord-11649, best inspect your wheel hubs before the trailer's used.

Seems that most of the M101's obtained under this contract came from the factory with hubs contaminated by metal chips and other foreign matter—stuff that can flub up the hub assemblies in a hurry if it's not cleaned out before the trailer's put into operation.

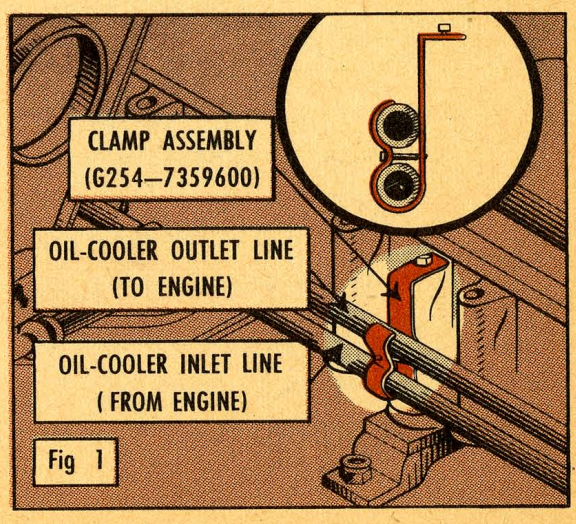
In case you find damage done already, get it to Ordnance fast. Should be able to get back some of Uncle's cabbage on the manufacturer's warranty.



Oil-cooler-line clamp

Been havin' trouble with your oil-cooler lines on Continental AV-1790 engines in M46A1 and M47 tanks? Relax. There's a new clamp (Ord Stock No. G254-7359600) that holds both lines, and prevents the vibration which was causing the lines to break at the oil filter and the oil cooler (Fig 1). This clamp won't fit M48's, which have a different clamp and shouldn't be bothering you, anyhoo.

Your requisition can be justified on the basis of MWO Ord G1-W39 (28 Aug 53) which says this fix is **urgent.**



To hold—not to hold

Whatever else you've been doing with your old tire flaps, the thing to do now is to hold 'em.

If you get a new tire you get a new flap. If you get a recap—no flap. An old flap's better than no flap a'tall.

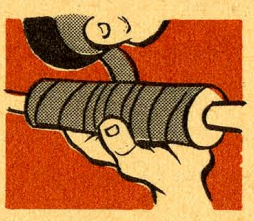
This doesn't mean to hoard 'em. Any time you get a new flap turn the old one in so's the other guy gets a break.

Shock stopper

So the outer insulation on your electrical cable's beginning to crack up and slough off? Heat, weather and ordinary wear take their toll, y'know. Best get it worked over before you wind up with a bare wire, short circuits and trouble.

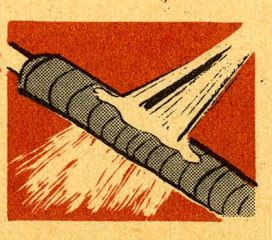
HOW TO MAKE A WORN INSULATION GOOD-AS-NEW....

1 APPLY TWO LAYERS OF SCOTCH ELECTRICAL TAPE OR BLACK ACETATE (VINYL) WHICHEVER IS HANDY.



½ INCH ORD STOCK # H005-0875850
¾ INCH ORD STOCK #H005-0875855
1 INCH ORD STOCK # H005-0875860

2 C-A-R-E-F-U-L! DON'T BEND IT, BOY. NOW BRUSH OR SPRAY WITH IGNITION INSULATION COMPOUND (ORD STOCK #52-C-3099)

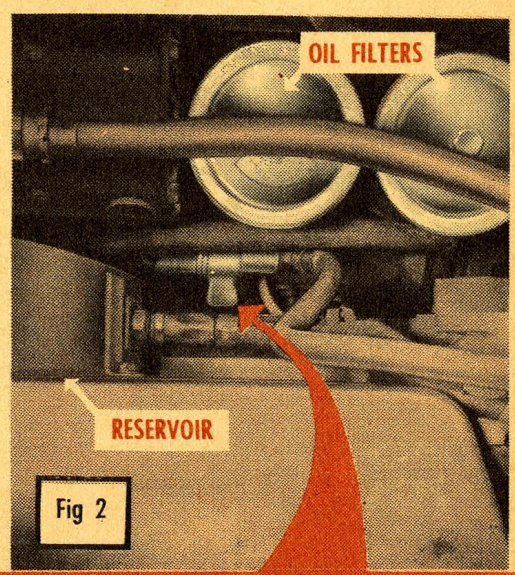


Power steering

Here's one for the power steering trucks, M51 and similar. Complaints of hard steering, excessive loss of oil and surplus oil in the air cleaner or blue smoke from the engine can sometimes be traced to a leak in the inlet hoses to the engine hydraulic-pump.

While spilled oil shows up a leak in the pressure side of the system, a tight-looking connection on the inlet side can be sneaking air into the pump. That air will be carried by the oil and make the system spongy—like air in your brakes. Then when the oil and air return to the reservoir, the foam comes to the top and carries oil with air up the reservoir vent-line to the air cleaner, and into the engine.

The particular fitting to check is the quick-disconnect where the oil line from the reservoir enters the engine pump (Fig 2).

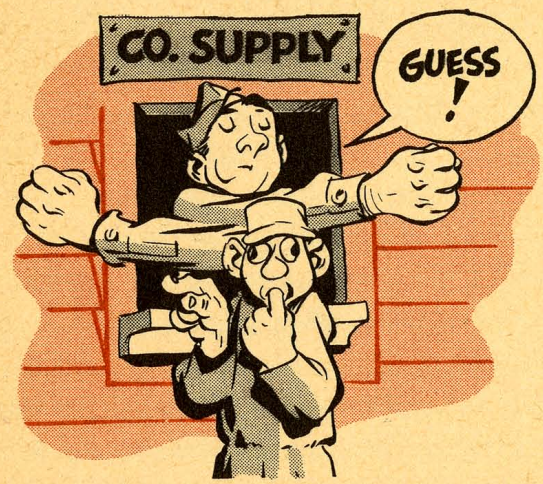


THE QUICK-DISCONNECT THAT NEEDS TIGHTENING IS FOUND DIRECTLY BELOW THIS ONE.

Connie Sez..

"Left is right" is right on the M75

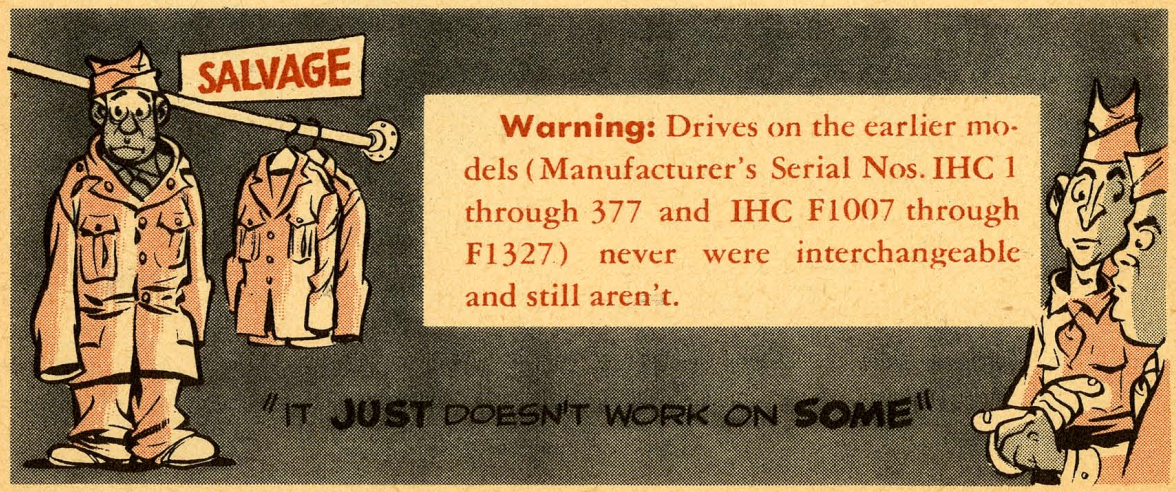
When you're given the go-ahead by your Ordnance support to replace a final

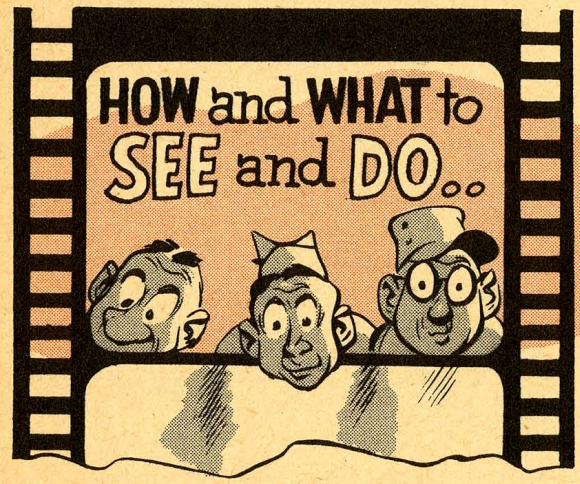


drive on your late model M75 vehicle, armored infantry, (Manufacturer's Serial Nos. above 377 and above F1327), don't be surprised if they give you a right one for a left—that's right—both right.

The right drive (Ord Stock No. G260-7987054) on those late model wagons is almost completely interchangeable with the left one (Ord Stock No. G260-7987053) and for that reason the left assembly is not being issued as a unit any more. You use the right drive and make the necessary changes in it.

Take the speedometer drive-adapter housing from the old left drive unit you're replacing and attach it to the new one. Relocate the drain plugs and breather so the breather and flat-socket head-plugs are uppermost when the drive is installed. You'll need these parts to convert the right drive each time you get a new one, so hang on to them. When they wear out, you can order new ones even though the left drive won't be around any more as an assembly.





When you're looking for maintenance tips—something you can't see in the TM's—remember you can get lots of help from pictures. They come in the form of movies, film strips, transparencies, slides you can flash on the wall, and illustration kits. And there are plenty to choose from.

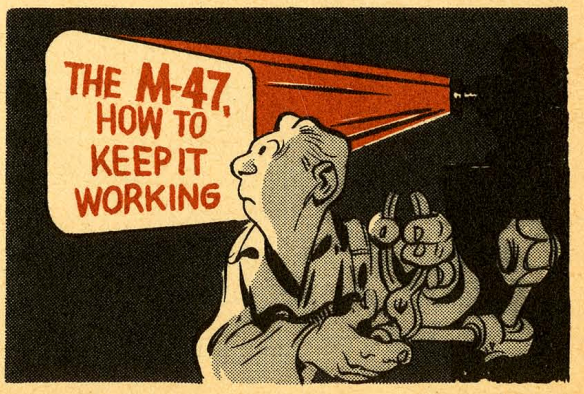
Motion pictures and film strips are listed in SR 110-1-1 and its changes. But there are some released since the latest SR change you might also want.

You get training films, film strips, and illustration kits from your local army film libraries. These libraries are located on nearly every installation. They also have projectors you can borrow.

Your local Training Aid Subcenters will lend you Graphic Training Aids Charts, Ordnance Corps Transparencies, transparencies on Hydra-Matic transmissions, and M249, M250 heavy gun-lifting truck transparencies. There's a list of Graphic Training Aids in SR 310-20-3.

The subcenters have a world of stuff —more than are in the catalogues. There's one near you, and your S-4 should know its whereabouts.

Keep your eye on the ball. **Know-how makes maintenance simple.**



THE SCOOP

HERE'S A LIST OF ADDITIONAL OFFICIAL PUBLICATIONS ON ORDNANCE EQUIPMENT WHICH ARE OF INTEREST TO A LOT OF YOU.

SNL'S

Ord 3 SNL A-1, Sec 1, Auto wpns (Other than AAA) MG mounts, mortars, carts, sleds, subcal rifles, Mar 54

Ord 3 SNL C-1, Major items, major Combos of Group C, Apr 54

Ord 9 SNL F-364, Mount, 'scope, M92 (T178) and T178E1, Apr 54

Ord 8 SNL F-373, 'Scope, panoramic, T149E1, Apr 54

Ord 9 SNL G-249, Vol 23, Winter kit for tractor, high-speed, 13-ton, M5, M5A1, M5A4, Apr 54

Ord 9 SNL G-249, Vol 24, Winter kit for tractor, high-speed, 18-ton, M4, M4A1, Apr 54

Ord 7 SNL G-280, Inf Veh, arm, tracked M59 (T59), Apr 54

Ord 8 SNL G-742, Truck, cargo, 2½-ton, 6x6, M34, M35, M44, M45, M46, M47, M48, M49, M50, M59, M108, M109, M275, V17A/MTQ, V18A/MTQ, Mar 54

Ord 7-8 SNL G-748, M101 cargo trailer, ¾-ton, 2-wheel, Mar 54

Ord 3 SNL J-22, Special tools for sight and fire-control on small arms, automatic guns, mortars, field artillery (SNL Group F), Mar 54

Ord 7-8 SNL J-191, Grinder, tool and cutter, bench type, ¼-hp, 110-v (Devere Model 20), Apr 54

Ord 7-8 SNL J-286, Machine, cyl boring; port, 115-v (Storm-Vulcan, Model NK-6), Apr 54

Ord 7-8 SNL J-530 (TO 17-10DB-13), Jack, hyd, push-pull type, w/pump, ram, hose, attachments, 10-ton cap (Hein-Werner, Model G10SUA and Hein-Werner [Formerly GAC] Model HC 700), Apr 54

Ord 7-8 SNL J-574, Tester, ign circuit, high ten sys (Heyer Products Co., Model M-1) and Tester, ign circuit, high ten sys (Heyer Products Co., Model M-1A), Apr 54

Ord 7-8 SNL J-631 (TO 17-5AB-119), Cleaner, high press, vapor gen, cleaning, rinsing, motor driven, 600-gal cap (Clayton "Kerrick" Model BKRO-600), Apr 54

Ord 7-8 SNL J-659, Grinder, crankshaft, 220-v, 18x48-in. cap, wheel size 24-in. (Storm-Vulcan, Model 15A), Apr 54

Ord 7-8 SNL J-677 (TO 17-5BC-69), Saw, band, metal cutting, hor ½-hp, 110/220-v, 8 x 16 in. cap (Wells Model No. 8), Apr 54

Ord 7-8 SNL J-686 (TO 17-5BJA-26), Press, drill, floor type, sensitive, ¾-hp, 110-v, 1-in. cap, 18-in. swing, Morse Taper No. 3 spindle (Atlas Press, Model 1800), Apr 54

Ord 7-8 SNL J-688, Valve refacer, 230-v, wet-type, hv-duty, 15/64 to 1-in. cap (Van Norman Model 500B), Apr 54

Ord 7-8 SNL J-702, Roller, tread, ¼-hp, 110-v (Jas C Heintz Model TR), Apr 54

Ord 7-8 SNL J-705, Grinder, pneu, port, stght hdl, 1½ x ½ in. wheel (Vitrified), and size 2 x ½ in. wheel (Organic) (Mall Tool, Model PG3018B), Apr 54

Ord 7-8 SNL J-706, Wrench, pneu, rev, impact type ¾-in. sq-drive, ¾-in. bolt cap (Thor Power Tool, size 48 Model 7265), Apr 54

Ord 7-8 SNL J-709, Drill, pneu, port, rev, w/feed screw, grip handle, 1¼-in. cap, ⅜-in. inlet (Chicago Pneu Tool, Model CP-327-R-250-3), Apr 54

Ord 7-8 SNL J-712, Saw, hack, dry-cut, ¼-hp, 3x3 in. cap (Lipe-Rollway Model C), Apr 54

Ord 7-8 SNL J-720 (TO 17-5BFA-15), Sander, portable, belt type, 115-v, min belt size 3 in. (Mall Tool Model 30), Apr 54

Ord 7-8 SNL J-723, Tester, volt-ohm-milliammeter, port (Westinghouse Elec Corp, Type PM-32 Style 1342842), Apr 54

Order 7-8 SNL J-731, Jack set, hyd, body and fender repair (H. K. Porter Model 1-AO), Apr 54

Ord 7-8 SNL J-734, Wrench, pneu, rev, impact type, adj torque, ½-in. sq drive, ⅝-in. bolt cap (Chicago Pneu Tool, Model CP-349-RS), Apr 54

Ord 8 SNL L-1, Small arms targets, Mar 54

MWO'S

MWO Ord D31-W36, Can trnspt wgn M2A1 (240-mm how M1); carriage trnspt wgn M3A1 (240-mm how M1): Install modif lunette, modify lunette assy, Apr 54

MWO Ord F235-W16, Periscopes M17, T36: Modify mount lugs, Mar 54

MWO Ord F271-W1, 'Scope mount M44: Modify into 'scope mount M44A1, Mar 54

MWO Ord G262-W10, M47 tank: Eliminate oil cooler fan clutch failures, Jan 54

MWO Ord G741-W5, ¼-ton, 4x4, trucks M43, M201: Install exhaust muff tail pipe ext, Apr 54

MWO Ord G742-W13, 2½-ton 6x6 trucks M34, M35, M44, M45, M46, M47, M48, M49, M50, M59, M108, M109, M110, M275: Improve lubri of trnsfr idler shft frt brg, Apr 54

MWO Ord G744-W11, 5-ton 6x6 trucks M40, M41, M51, M52, M54, M55, M61, M62, M63, M64, M139, M246: Modify crankcase, dist vent sys, Cont R6602 eng, Apr 54

TB'S

TB Ord 465 (TO 19-75AA-100), Pedestal truck mts M31A1, M31C: Install on trucks M38, M38A1, Apr 54

TB 9-AMM 4 (TO 39-1-14), Small-arms Ammo: Lots, grades, Apr 54

TB 9-718A-11, M47 tank: Prevent fuel tnk shut-off valves vibrat "closed," Mar 54

TB 9-755B-2, M75 arm inf veh (T18E1): Prevent pipe plgs freeze in trk supt roller hub caps, Apr 54

TB 9-804-13, ¼-ton 4x4 truck M38: Prevent fuel, vent lines chafe at fuel tnk, Apr 54

TB 9-840-10 (TO 19-75C-3), ¾-ton 4x4 trucks, M37, M42, M43, XM56, XM152, M201 (V-41/GT): Adjust ford vlv cont cable, Apr 54

TB 9-840-14, ¾-ton, 4x4, trucks M37, M42, M43, M201: Alter defrost duct, Mar 54

TB 9-855-1 (TO 28-10-28), Small arms tgts: Local fabr wood compnts, Mar 54

TB 9-1819AB-2, Hydra-matic trnsmn (GMC Model 302M): Repair govnr pingrs, Apr 54

TM'S

TM 9-6073, Suprelev Trnsmtr M22, Apr 54

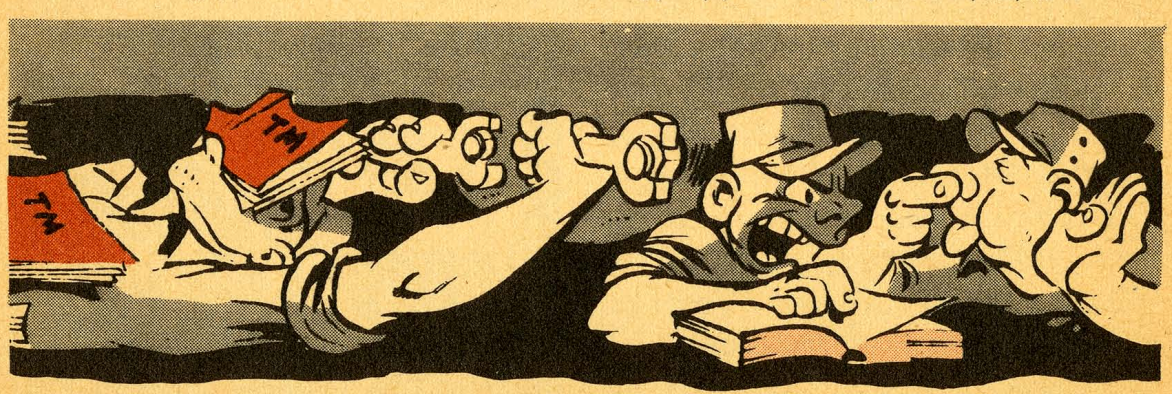
TM 9-7002, T59 arm inf veh T59, Apr 54

TM 9-8015-1 (TO 19-75B-21), Engine (Willys-Overland Model MD) and clutch for truck M38A1, Apr 54

TM 9-9033-8, 6-in.-whl-size univ-current 115-v ½-hp port grinder (Milw Elec Tool Corp. Model V-196) (40-G-128-8), Apr 54

MISCELLANEOUS

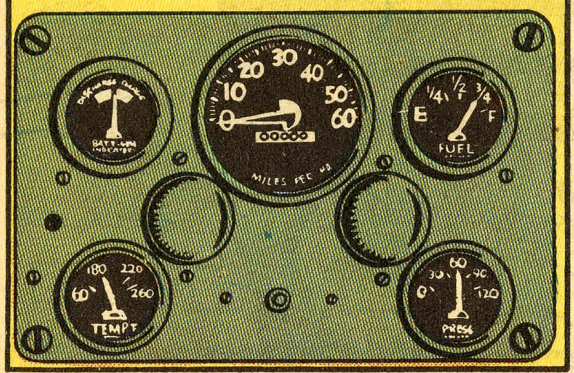
FTR 762-A-1, Launcher, 762-mm, trk-mtd, XM 289, firing rkt 762-mm, M31, Feb 54



JOE DOPE
HOW TO PERFORM BEFORE — DURING — and AFTER OPERATION SERVICE ON YOUR VEHICLE
NO...NO! STOP! DON'T GET SO DISCOURAGED! WAIT!!
IT AIN'T AS TOUGH TO DO AS ALL THAT! WITNESS....
1. BEFORE YOU TAKE OFF
CHECK...
FUEL, OIL
AND LOOK FOR ENGINE LEAKS
NEED ANY REFILLS?
GOTTA ADD WATER? .....IDLE ENGINE, ADD H20 SLOWLY. CHECK FOR LEAKS.
TIRES OKAY? USE A GAGE Inflate If Needed
TRACKS OKAY?
GLOVE COMPARTMENT
GOT EVERY-THING?
TM
TRIP TICKET
SF 91 REPORT OF ACCIDENT
LO
DD FORM 518 ACCIDENT IDENTIFICATION
LIGHTS
HORN
WIPERS
MIRRORS
REFLECTORS
VISION DEVICES
BODY OR HULL
ARMOR
TOWING CONNECTIONS
TRAVELING LOCKS
HATCHES
DOORS
PAULINS
TOOLS
ETC . . .
CHECK 'EM OFF

WHILE WARMIN' ER UP

YOUR DASH SHOULD LOOK LIKE THIS:



2. DURING OPERATION

DASH INSTRUMENTS REGISTERIN' RIGHT?

ANY UNUSUAL NOISES?

CLUTCH, BRAKES, STEERING, GEAR SHIFT BEHAVIN'?

3. AFTER OPERATION

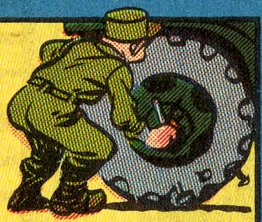
CHECK: FUEL, OIL, WATER
ADD IF NEEDED—CHECK ANTIFREEZE

LOOK FOR LEAKS IN ENGINE COMPARTMENT

TIRES . . .

AIR LOST?
UNUSUAL WEAR?

MISSING CAPS?

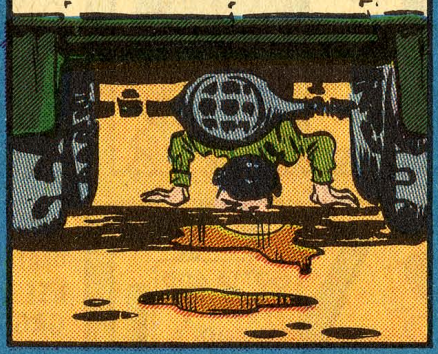


DON'T LEAVE GLASS, NAILS, ETC., IN FOR FUTURE BLOWOUTS. DON'T BLEED TIRES FRESH IN FROM A RUN.

TAKE STONES OUT OF DUALS

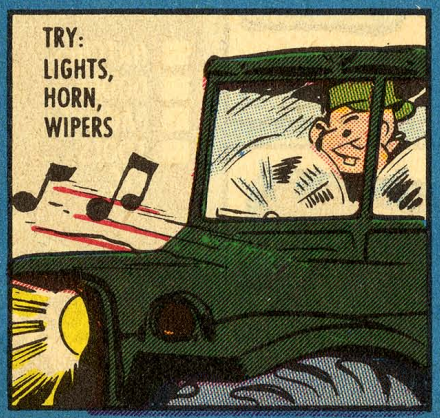
CORRECT TENSION IN TRACKS

TRACE LEAKS TO SOURCE

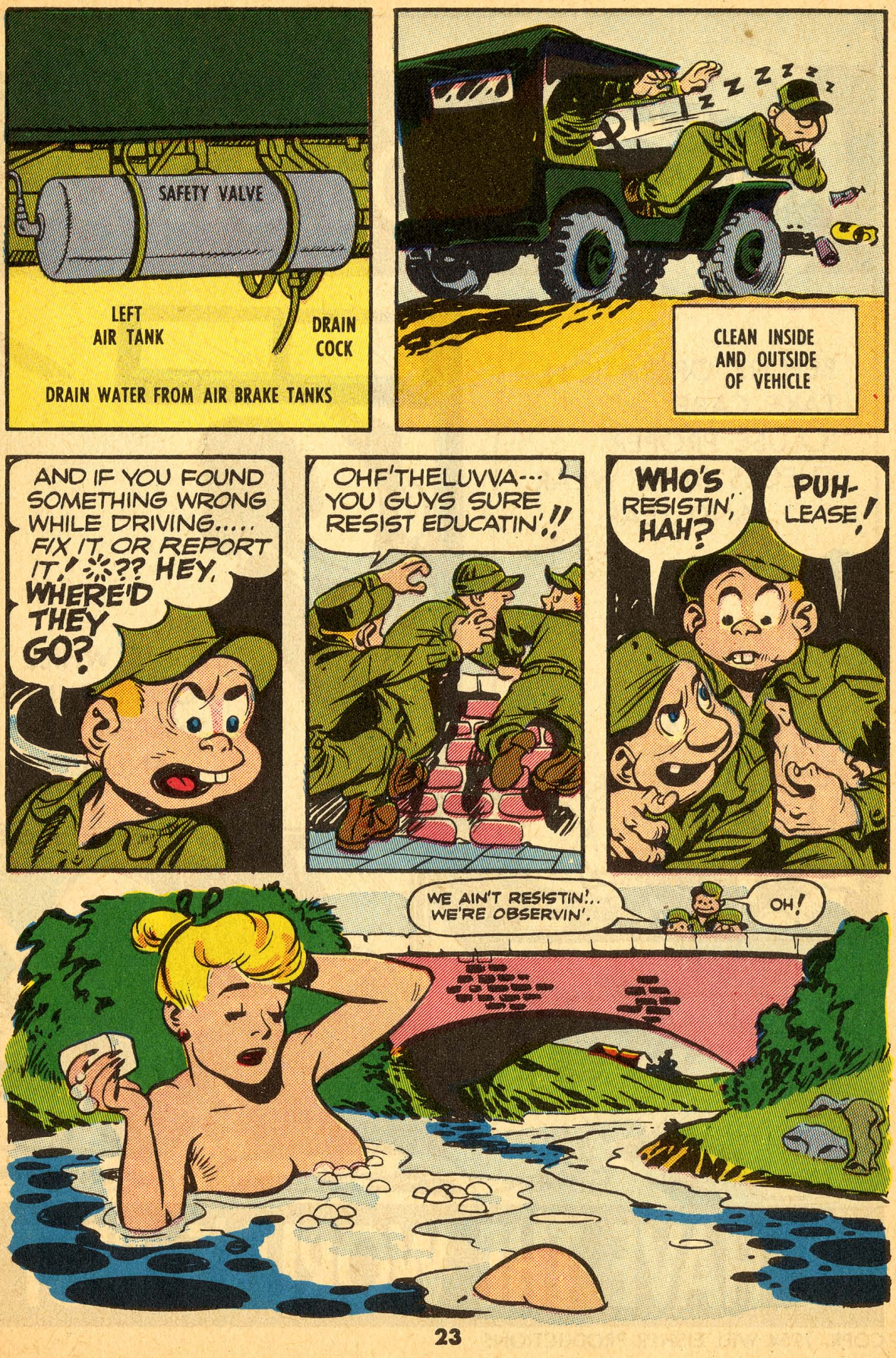


- ☐ BODY OR HULL
- ☐ ARMOR
- ☐ TOWING CONNECTIONS
- ☐ TRAVELING LOCKS
- ☐ HATCHES
- ☐ DOORS
- ☐ PAULINS
- ☐ TOOLS
- ☐ SPRINGS
- ☐ SUSPENSIONS
- ☐ SHOCK ABSORBERS
- ☐ TORQUE RODS

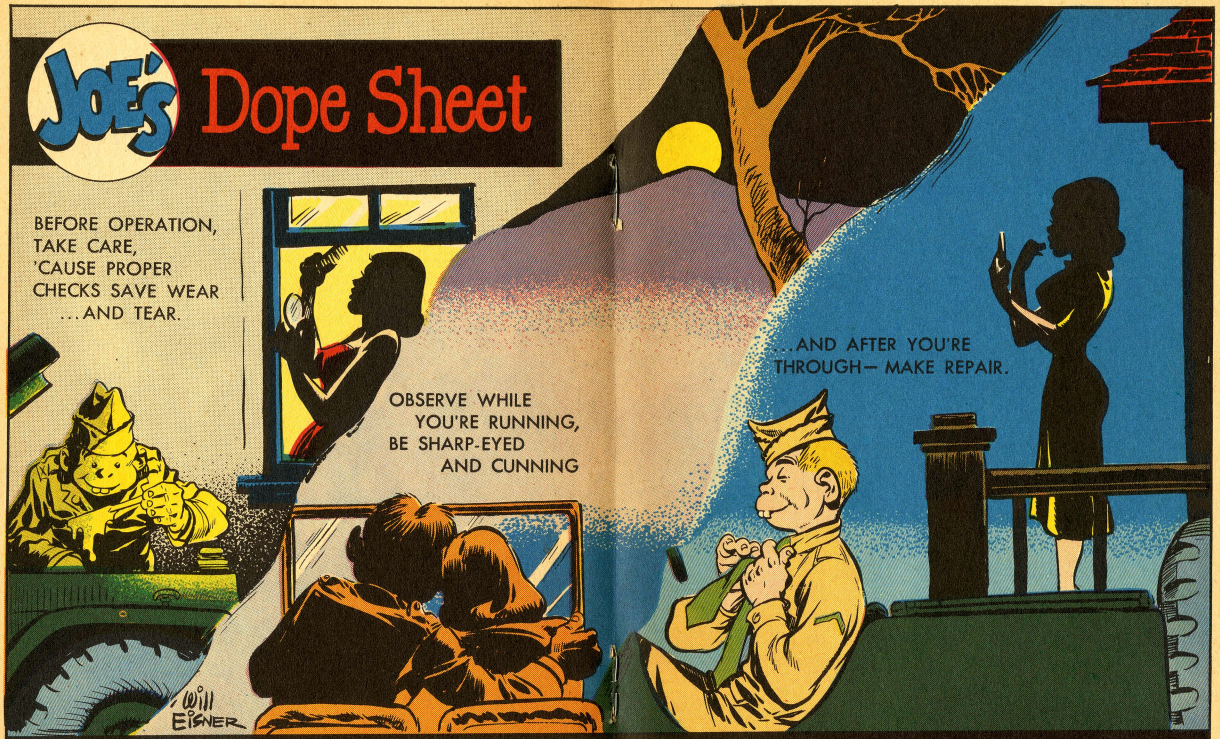
TRY:
LIGHTS,
HORN,
WIPERS



CLEAN ALL GLASS

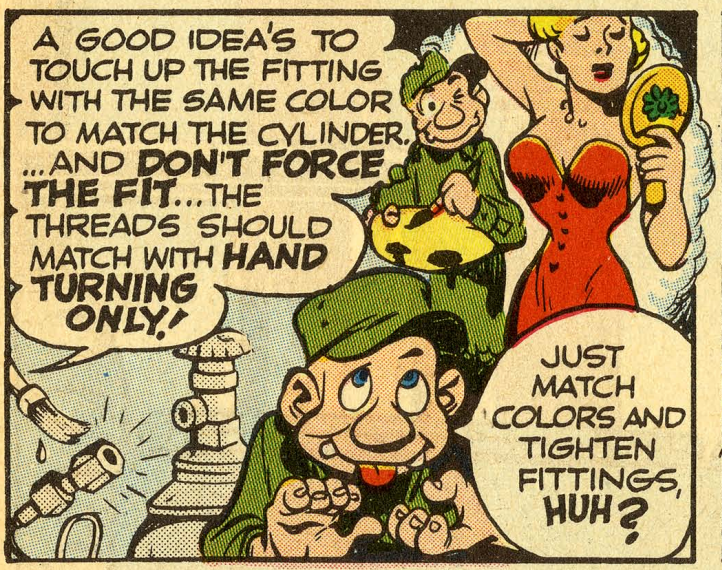

SAFETY VALVE
LEFT AIR TANK
DRAIN COCK
DRAIN WATER FROM AIR BRAKE TANKS
CLEAN INSIDE AND OUTSIDE OF VEHICLE
AND IF YOU FOUND SOMETHING WRONG WHILE DRIVING..... FIX IT, OR REPORT IT,! ??? HEY, WHERE'D THEY GO?
OHF'THELUVVA--- YOU GUYS SURE RESIST EDUCATIN'!!
WHO'S RESISTIN', HAH?
PUH-LEASE!
WE AIN'T RESISTIN'!.. WE'RE OBSERVIN'.
OH!

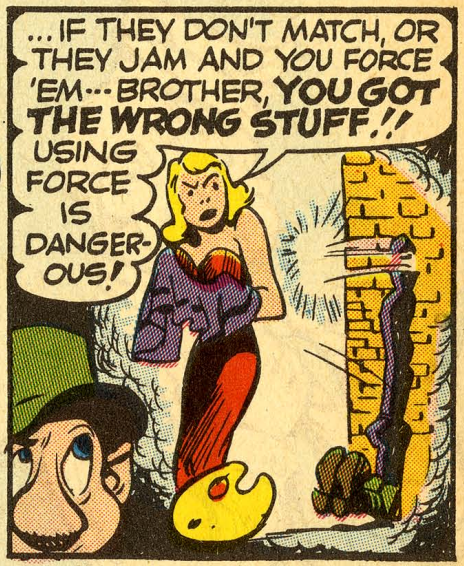
COPR. 1954 WILL EISNER PRODUCTIONS

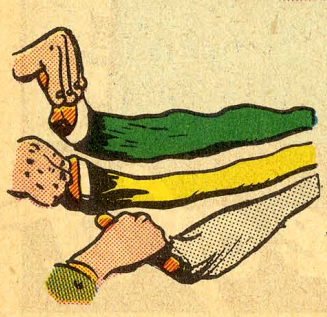


COPR. 1954 WILL EISNER PRODUCTIONS

UIPMENT... *Take care of it*

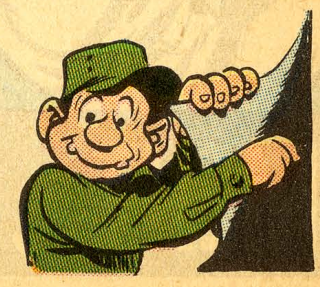


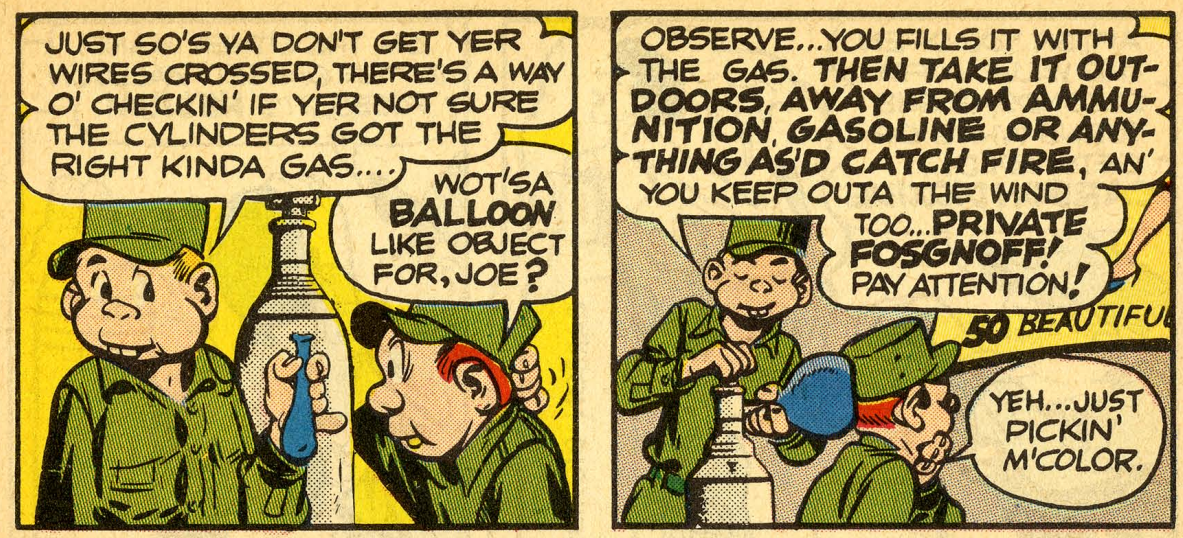




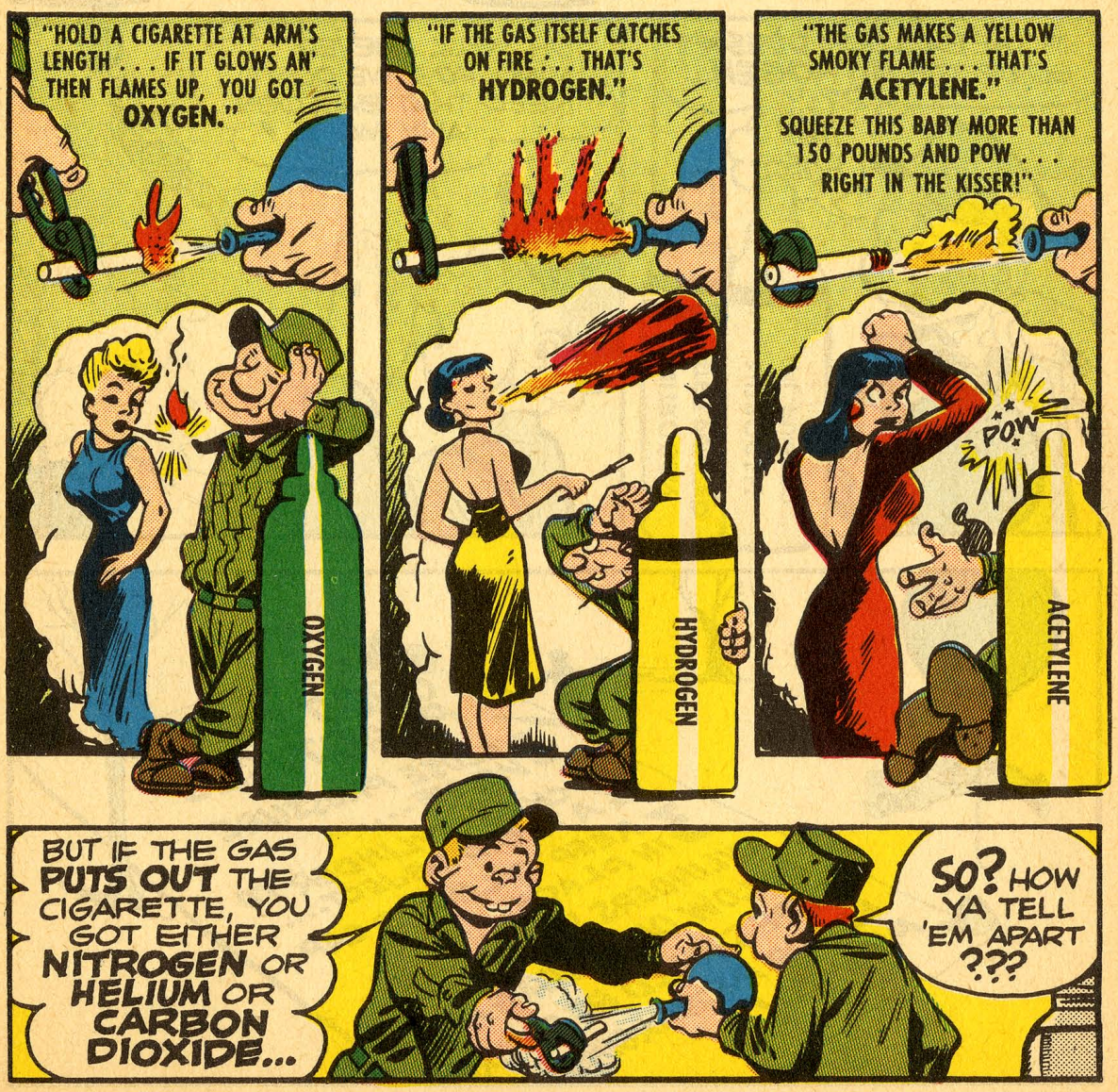
FOR COLOR-CODING COMPRESSED GAS EQUIPMENT, USE ENAMEL, SYNTHETIC, GLOSS TT-E-489, CLASS A.
OXYGEN USES GREEN (NO. 1445)
ACETYLENE USES YELLOW (NO. 1310)
NITROGEN USES GREY (NO. 1625)

TURN THE PAGE AND SEE HOW THEY'RE MARKED

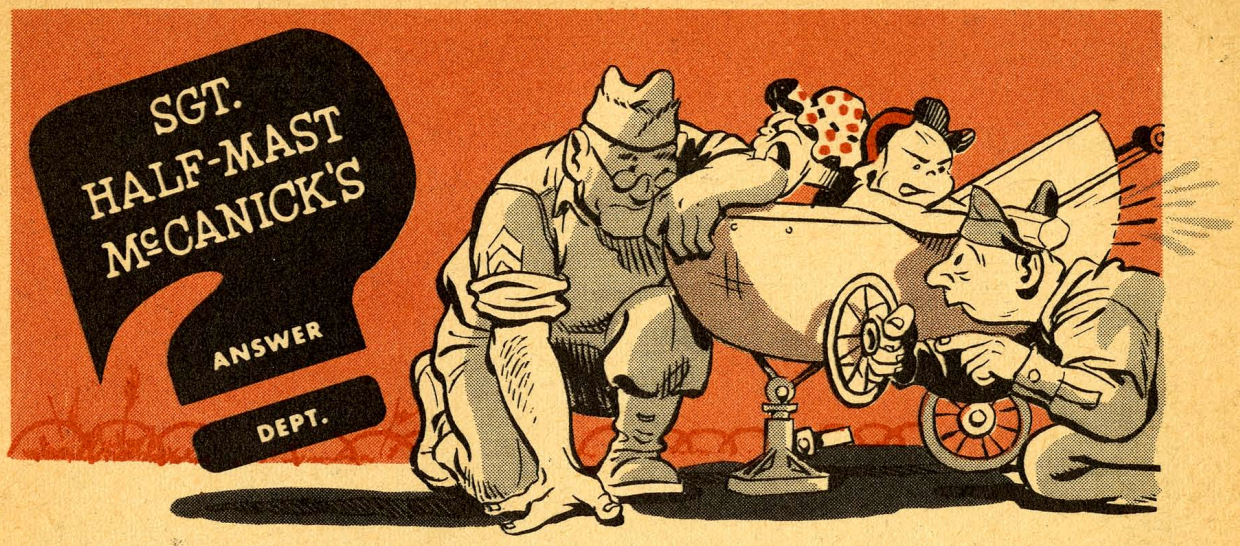




"THERE ARE 3 REAL HOT NUMBERS YOU WANNA STEER CLEAR OF."



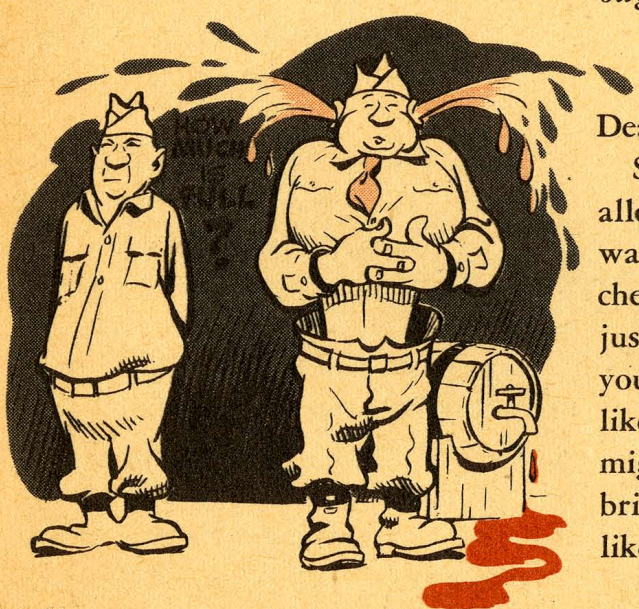
AFTER YOU OPEN THE VALVE A FEW SECONDS, IF SHE TURNS WHITE OR GETS COLD.... CARBON DIOXIDE.
CARBON DIOXIDE
ON THE OTHER HAND, IF THE GASSED BALLOON RISES,..IT'S HELIUM.
HELIUM
OIL FREE
IF THE BALLOON DOESN'T GO UP..IT'S NITROGEN...
??? HEY FOS---
NITROGEN
OIL PUMPED
NITROGEN
WATER PUMPED
OH, WELL... NEVER MIND, FOS, WE DON'T NEED THAT BALLOON ANY MORE!
GOOD SAFETY PRACTICES
1 CLOSE PRESSURE VALVE.....
2 CHAIN CYLINDER TO A RIGID OBJECT.....
3 KEEP CYLINDER CAP IN PLACE.....
CYLINDERS WHICH FALL BELOW OPERATING PRESSURE SHOULD BE RETURNED FOR RECHARGING.
PRONTO!



WHO'S FULL?

Dear Half-Mast,

The boys around here sure would like to know of some standard on differential and transmission lube levels, like Low, Safe Driving Range, and Full, so there's a reasonable range of tolerance.



I have seen gigs put on as little as 1/16-inch variation from the standards. This is ridiculous. If you fill to the precise mark and drive a cold vehicle 100 yards, you'll get a low level if you check it at once. And 15 minutes later the oil will drain back from the upper housing and read correct again.

If there's not enough capacity on those cases to allow for at least ¾ inch, if not a full inch of tolerance, then they ought to be bigger.

SFC J. L. D.

Dear SFC J. L. D.,

Seems like most any inspector would allow for that, particularly if a guy was smart and told him **before** the oil check was made that the vehicle was just driven and might check low. When you give The Man some conversation like that **before** trouble shows up, it might sound like a **reason**—when you bring it up **afterward**, it sounds more like an **alibi.**

Half-Mast

HINTS ON DIRTY WORK

Dear Half-Mast,

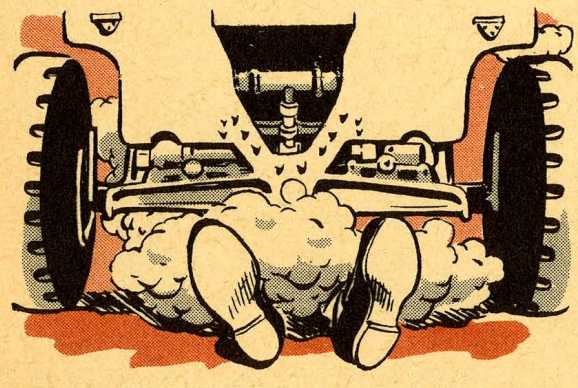
What's the dope on using diesel fuel to clean the undercarriage and the exterior paint covering of vehicles and gun carriages?

Cpl M. S.

Dear Cpl M. S.,

TM 9-718, TM 9-788, TM 9-761 and others say that diesel fuel oil, gasoline or benzene (benzol) for cleaning is prohibited.

Use Solvent Mil-S-11090 (Ord Stock No. 51-S-4717-725 for 5 gallons) to clean road tars and grease from the undercarriage and painted parts. Steam off with steam jenny, or rinse with hot water. Or if you still have some Compound, grease cleaning (ES-398b), Ord Stock No. 51-C-1581-515, which you mix with kerosene or solvent (one part compound to four parts kerosene or solvent). Use it then rinse with cold water.



If issue grease solvents aren't available, use dry-cleaning solvent (Stoddard solvent), volatile mineral spirits, or kerosene, by themselves for emergency cleaning.

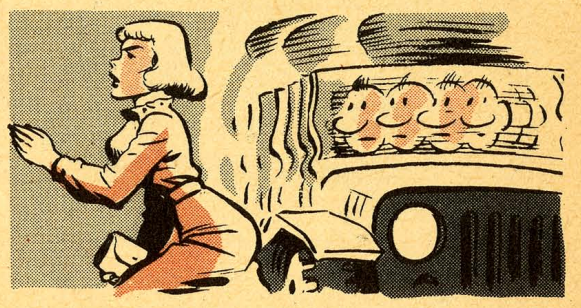
Half-Mast

SHIMMY TO SHAKES

Dear Half-Mast,

My M38 shimmies at speeds of 15- to 20-MPH. Will it help if I weld some beads in each front spring side-holder?

Cpl R. L.



Dear Cpl R. L.,

Welding beads in the M38's spring-holders could be dangerous. It may take out side motion, but the spring's attaching eyes could break. Then instead of the shimmy, you'll get the shakes. The spring should be able to pivot around those bolts. And if you drive cross-country much, cutting out the side motion wouldn't solve the problem anyway.

It could be your front wheels are unbalanced. Dirt, mud, or weak springs may be doing the dirty work—'specially if that mud freezes on one side of your wheel.

Or it could be a worn and loose steering bell-crank that needs replacing. But check your shock absorbers, toe-in, tire pressure, loose tie-rods, steering knuckle and steering gear for proper adjustment, as well as the whole steering gear assembly. Make sure first that one of these isn't guilty before turning in the bell-crank.

And finally, to add friction to the steering system, try using a neoprene seal (Ord Stock No. G740-7994778) on the ball joint. Those cork or felt jobs aren't always up to it.

Half-Mast

M52 STEERING

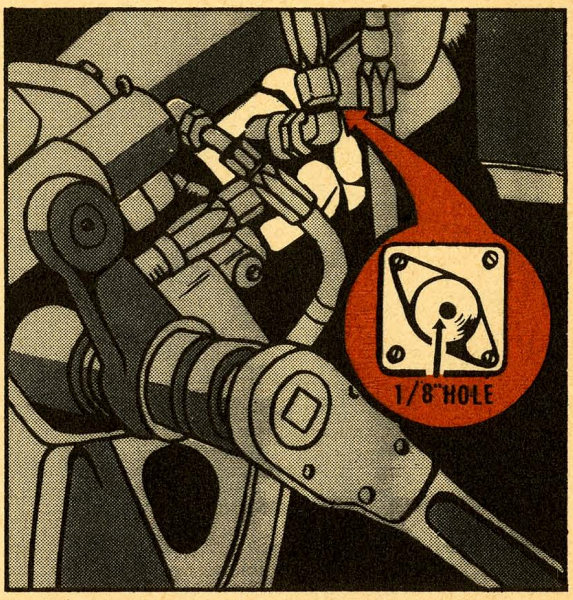
Dear Half-Mast,

I've seen somewhere that there's been a modification on the steering of the M52 tractor, but can't seem to find anyone who knows anything about it. Think it was a small hole drilled in the by-pass to relieve pressure build-up. How about it?

WOJG W. L. S.

Dear WOJG W. L. S.,

You're right. There is a modification on the M52—and all the other IHC 5-tonners. The change was made at the factory late in 1953, and an MWO was whipped up to cover vehicles already in the field. A 1/8-inch hole is drilled (Fig 1)—not in the by-pass, but—in the spool cover on the rear of the hydraulic control valve assembly. This allows collecting oil to escape, keeps pressure from building up to lock your steering. A weather-proofing kit (Ord Stock No. G744-5701912) is also provided, with a pressure relief plug and retainer to keep out water and dirt.



This MWO is classified as **normal**, which means that there's no need for a big stampede to your Ordnance shop. However, all trucks concerned oughta be taken in for the change as local conditions permit.

Half-Mast

Yep—let 'er fly when you have a problem, an idea for better maintenance or a fix for better operation of Ordnance or Engineer equipment. Put it down on paper—any kind—and send it off to **Sgt Half-Mast, PS Magazine, Aberdeen Proving Ground, Maryland.**

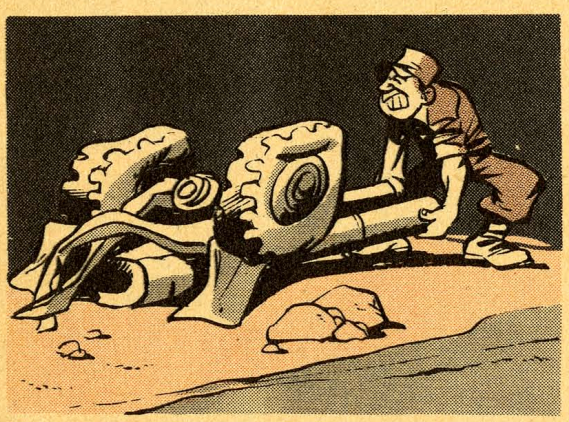
DON'T FLIP YOUR GUN

Dear Half-Mast,

We've been having trouble with our 105-mm howitzers flipping over when one wheel hits a rock on the range trails.

It has helped to let some of the air out of the tires.

Sgt E. J. S.



Dear Sgt E. J. S.,

What you need is less speed—not less air.

Half-Mast

OIL SEAL MIX-UP

Dear Half-Mast,

The responsibility for cleaning and packing the wheel bearings on our 8-inch howitzer M2 is the duty of a using unit.

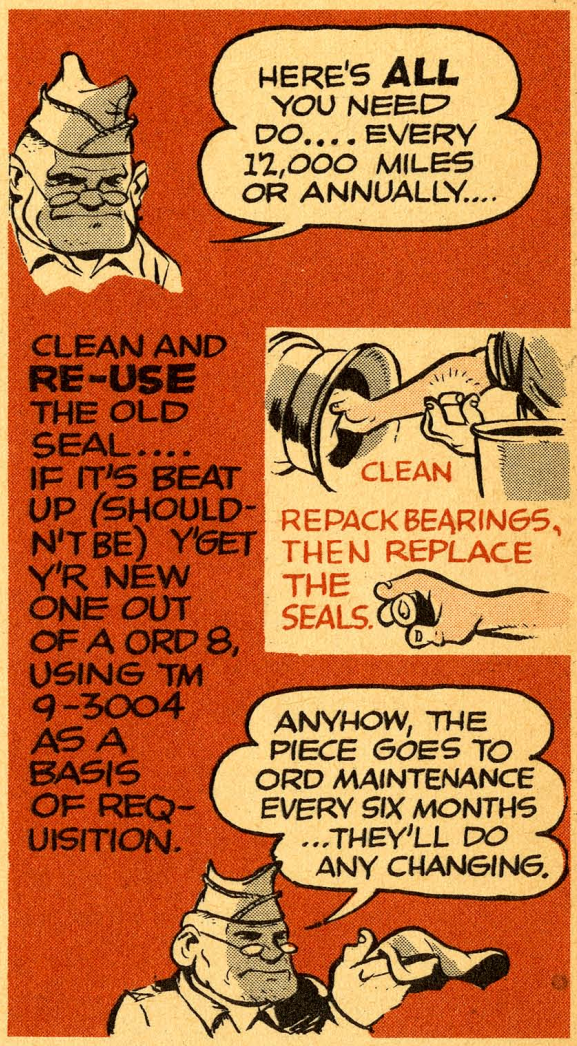
We figure that when you pull a wheel bearing to clean and repack it you never replace the old oil seal—you stick in a new one. But, the oil seals are listed in Ord 8 and not Ord 7. Why?

PFC D. A. T.

Dear PFC D. A. T.,

You might be right, but this is the way it looks from here.

Cleaning and repacking wheel bearings on your artillery pieces is a dual responsibility. You've got the job when necessary along with Ordnance maintenance.



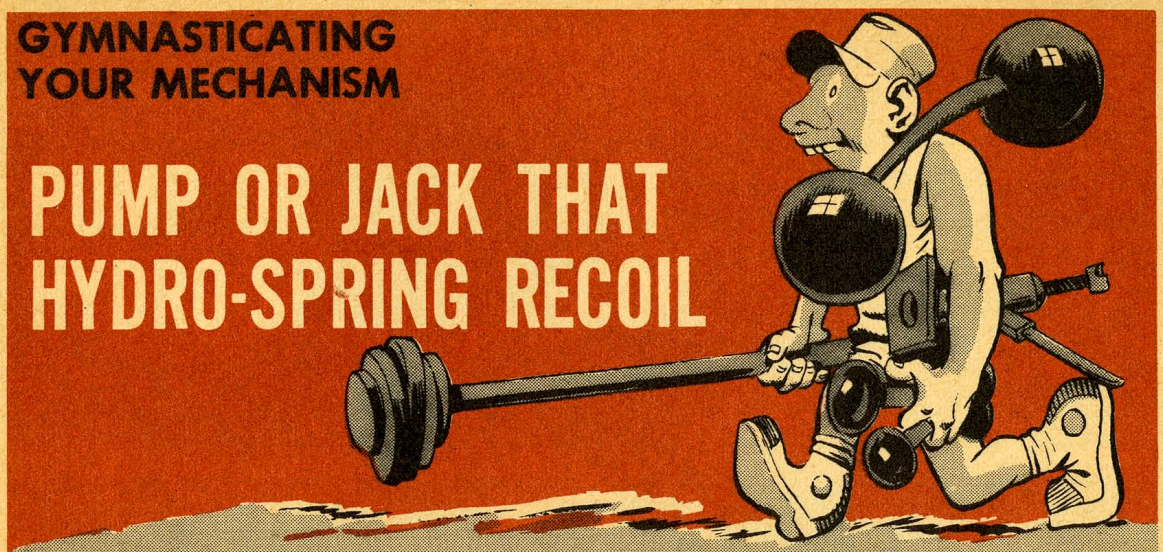
Looks like a deal to keep from throwing away some good seals. Like if Ordnance maintenance just stuck in some new seals, then you pull a check right after them—you throw away a practically new seal.

Remember, if you do need one you can get it.

Half-Mast

GYMNASTICATING YOUR MECHANISM

PUMP OR JACK THAT HYDRO-SPRING RECOIL



BEFORE YOUR TANK GUN GETS THE RHEUMATIZ, HERE'S A CURE BETTER'N A LINIMENT RUBDOWN

Everybody's told everybody how to exercise a hydropneumatic recoil mechanism. You boys with the hydro-spring jobs felt slighted, so here goes with the straight dope on how to exercise a hydro-spring recoil mechanism—like on your tanks.

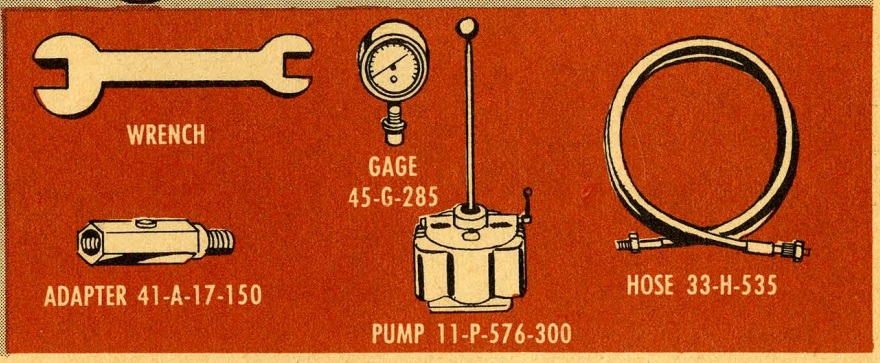
With the hydro-spring you have a spring and oil to take care of recoil. The concentric type hydro-spring consists of a large piston and spring inside a cylinder—the cannon tube operates or recoils through it.

When a gun sits around waiting to be fired—sometimes the wait is long. The highly-finished surfaces and seals in the recoil mechanism get dry and go to heck without oil.

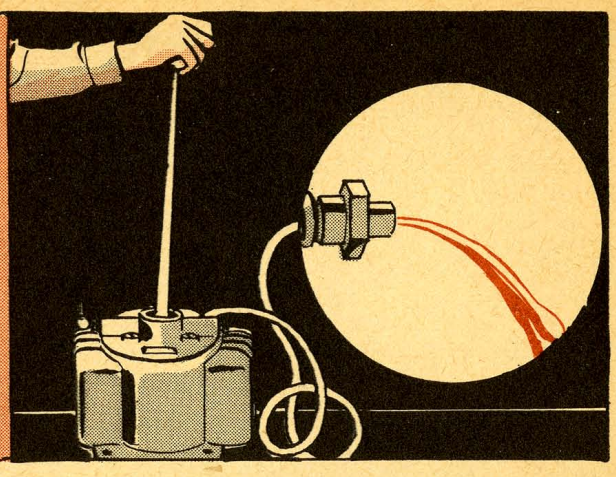
There are two different ways you can get an oil film on these seals and sliding surfaces—and both of them is by exercising. Not you—the gun. You use one method or t'other as required to keep these parts juiced up.

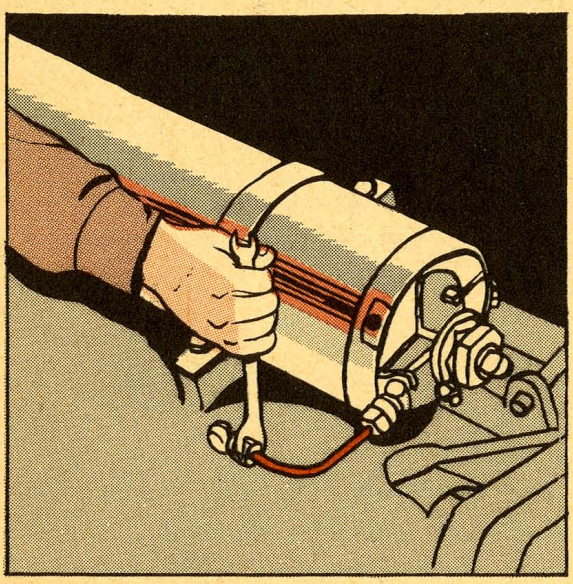
PUMP IT

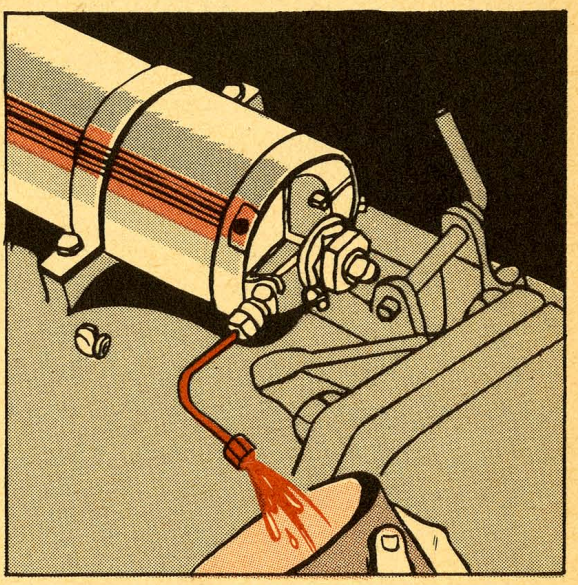
Best idea is to use the M3 hydraulic oil-pump (Ord Stock No. 11-P-576-300) for the job of exercising a hydro-spring.



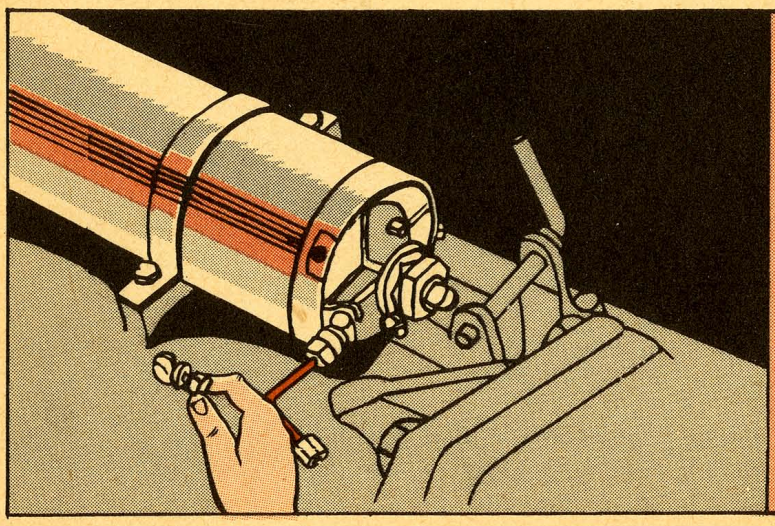
When you fill the M3 pump with recoil oil for the job, make sure you use the right type of oil. Get it from a clean container and see that it's free of dirt, water and air. After you fill the pump, work it until you get a flow of air-free oil from the hose.







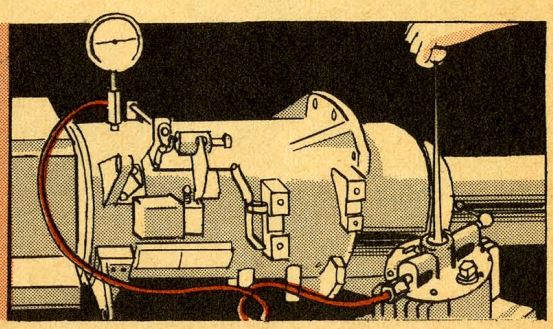
Then get a clean can. Disconnect the replenisher line at the recoil-cylinder fitting and catch the oil. You do this 'cause during the exercising cycle you run up a pretty high oil pressure and the replenisher isn't built to take it.

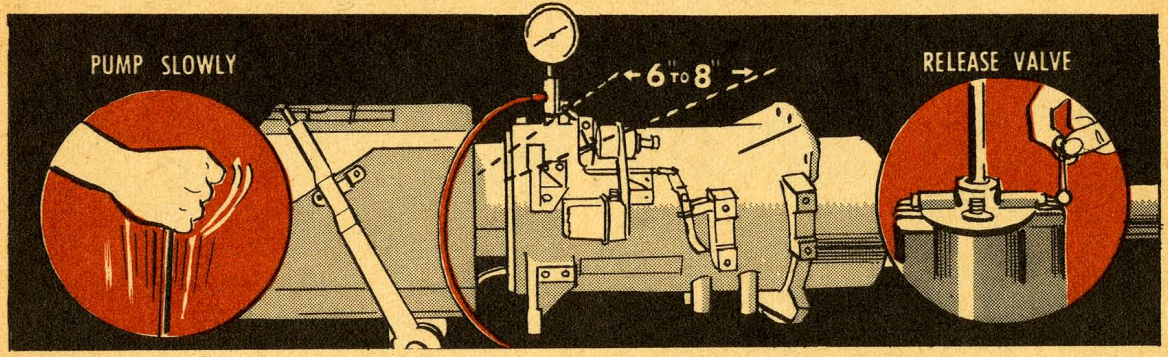


When you remove the line, plug the cylinder fitting tight so you don't have oil leaking out of it during the exercise.

Make sure you have the right connector for the oil-pump hose. It won't fit without an adapter—in some cases. Most times you'll find the recoil-oil cylinder filling-hole threads are 1/2 inch-20 straight thread. If so, Connector (Ord Stock No. H106-0423089) will do the job. In other cases you might need an Adapter (Ord Stock No. J013-7081491) and Gage (Ord Stock No. J013-5506529) to do the job. Check first and be sure.

Now screw the M3 oil-pump hose in the recoil-cylinder oil-filling hole. (Be sure you don't screw into the replenisher oil-filling hole.)





Work the pump slowly and it'll force the gun out of battery. When the gun moves out of battery 6 to 8 inches, you stop pumping. To bring the gun back, release the hydraulic valve on the pump.

If 400 lbs pressure don't start the gun out of battery, use a small pinch bar on it to get it going.

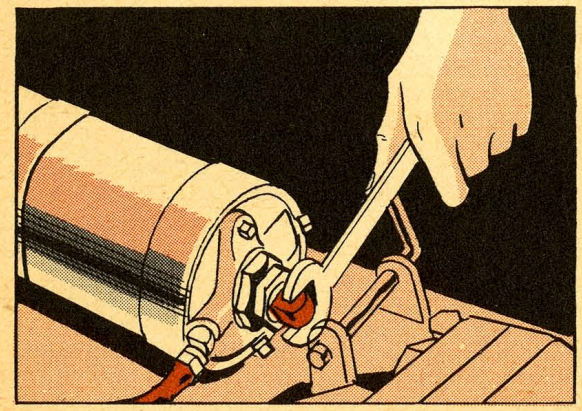
Pump 'er out of battery three to four times. This'll lubricate the recoil slide area and the seals.

Be sure you keep out of the path of recoil—same as you would during firing.

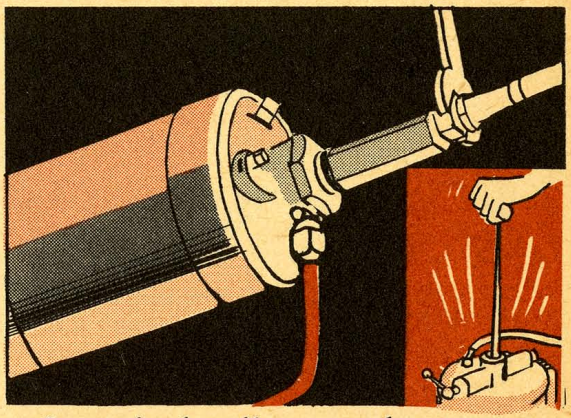
When your exercising is completed, you gotta re-establish the correct oil level in the replenisher. To do this, you have to remember again that you need the right type of clean air-free oil. Oil gun (Ord Stock No. 41-G-1362-500) is what you need for the job.

You can also use the M3 oil pump to fill and purge the replenisher as well as the recoil mechanism. In fact, it's a lot easier than switching to the 2-oz or 8-oz filler-gun.

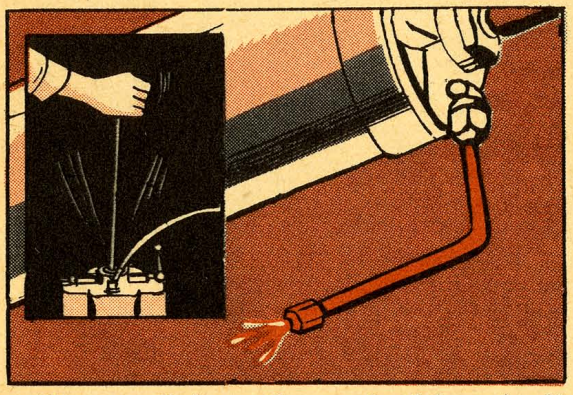
So's the M3 pump hose will fit the 1/2 inch-20 thread on the replenisher, use Connector, Ord Stock No. H106-0423089. This connector will screw into the filler-valve hole on the replenisher cylinder and give you a hook-up for the pump hose.



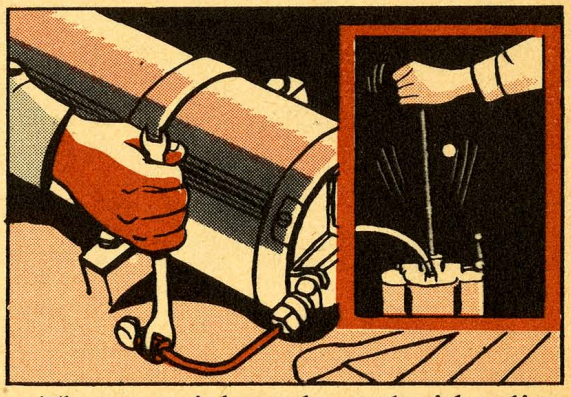
Remove the replenisher filler-valve plug.



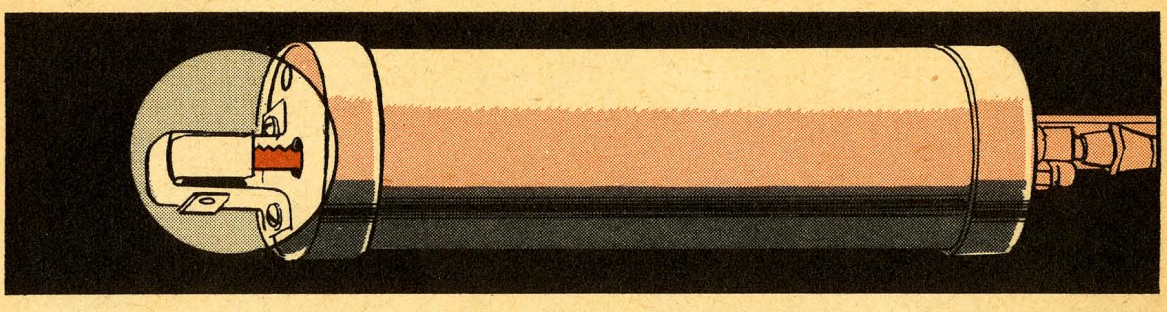
Screw in the oil gun or the connector and pump hose.



Pump oil into the replenisher until air-free oil flows from the loosened replenisher-hose connection.

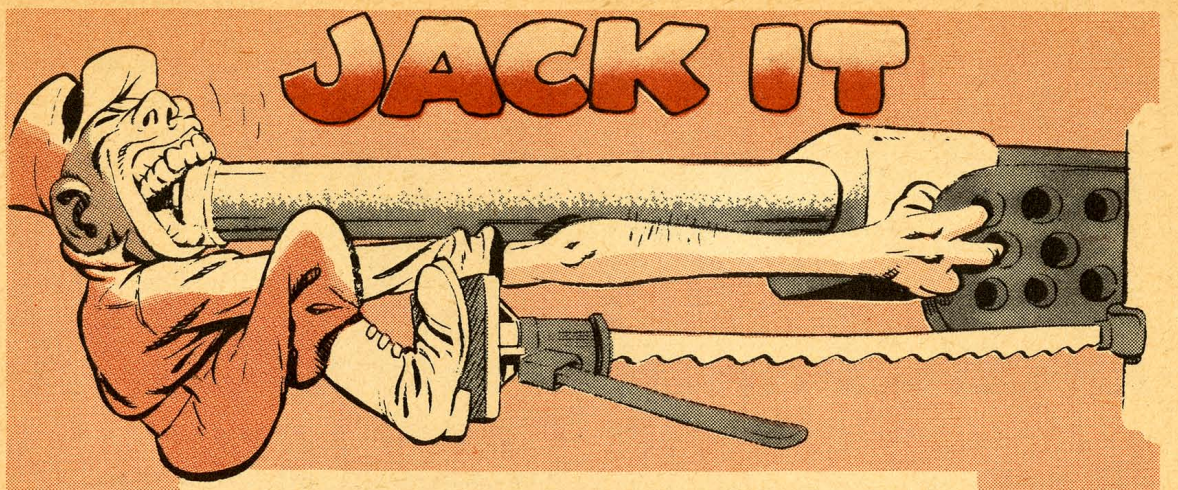


Then you tighten the replenisher line back into the recoil cylinder and pump oil into the replenisher.



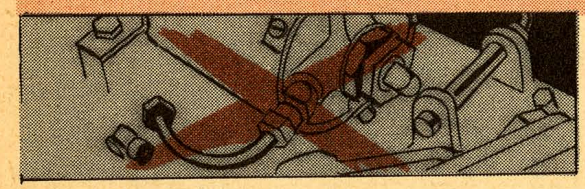
You can get the correct oil level by watching the indicator on the replenisher tank. Keeping a daily check on this indicator will tell you whether or not you have the right amount of oil in the recoil cylinder. (See page 39.)

JACK IT

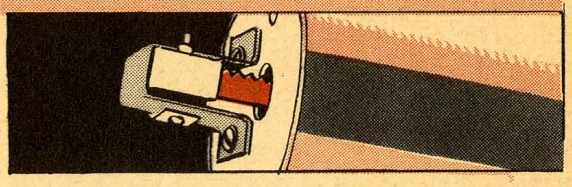


If you can't get a pump for the exercising, you have the jack method to use. The hydraulic jack (Ord Stock No. 41-J-118) or the screw type (Ord Stock No. 41-J-159-140) will do the job.

WITH THE JACK METHOD



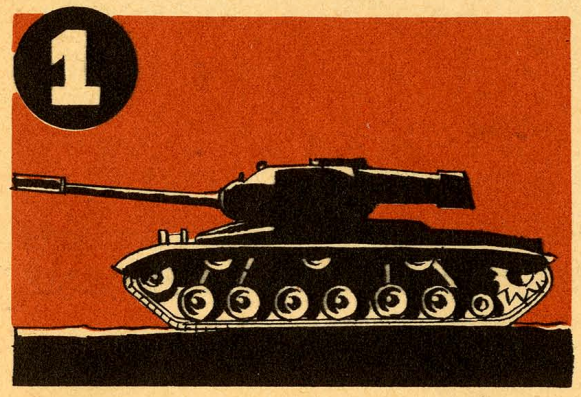
You don't have to disconnect the replenisher line.



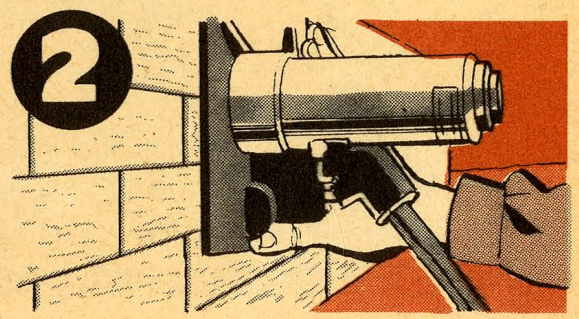
You do have to check the replenisher indicator before and after exercising.

If the replenisher indicator shows that you need oil, you take the same care and precautions as always in re-establishing oil level.

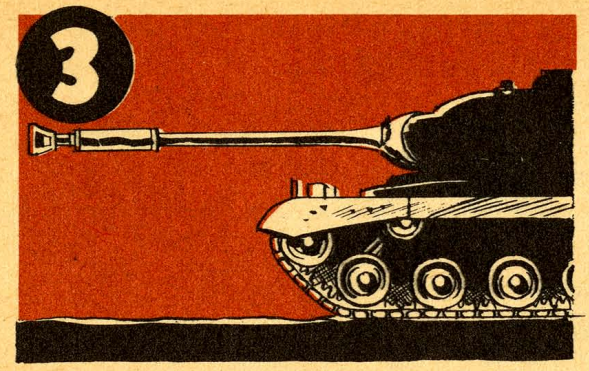
When using a jack on the end of the tube to back the gun out of battery, there're a few musts in the job.



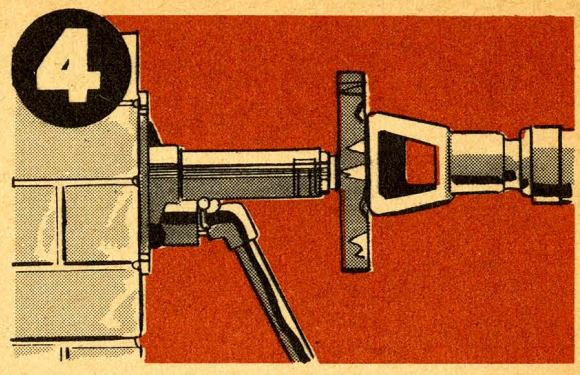
It has to be done on level ground.



A straight up-and-down object (wall, tree, pole) must be used to support the jack.



You gotta get the gun as level as possible in elevation.



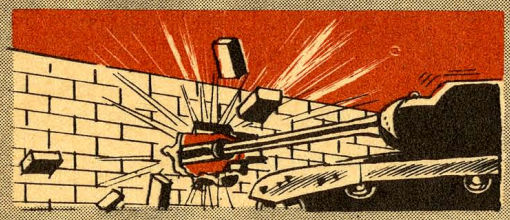
You need a protective plate or board between the end of the tube and jack.

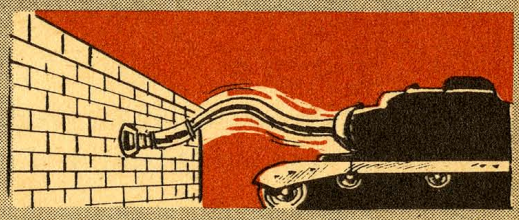
You stop jacking when the gun has moved out of battery 6 to 8 inches. Move it in and out of battery three or four times.

WRONG WAY

What did you say? Trying to exercise a hydro-spring by placing the end of the tube against a tree or wall and driving the vehicle forward to move the gun out of battery? You're just not with it. That's nowhere, man.

You've got a lot of weight in a tank and a lot of power pushing that weight. It's darned near impossible to control that accelerator so you only go forward far enough to move the gun out of battery 6 to 8 inches.





Take a guy with an itchy foot. What happens? He either pushes the tube thru the wall or bends the tube.

When you exercise your gun, you have to do it easy and just right—else you'll damage delicate parts and won't get any good out of it either.

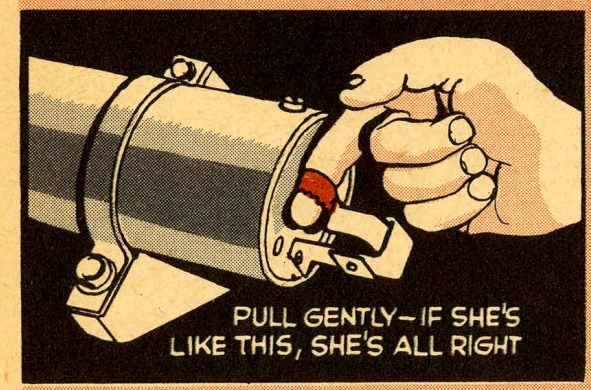
Maybe an M3 oil pump's a little harder on the back. Or, maybe it's a lot of trouble getting everything lined up when using a jack—but it'll pay off.

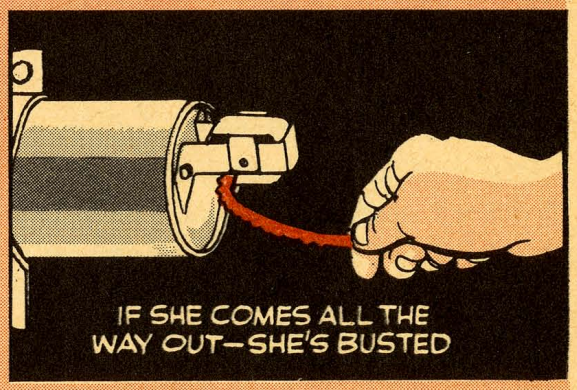
And—TB Ord 303 is being revised like it sez here.
Be on the safe side and pump or jack it.
You might end up exercised—but your gun will be, too.

TRICKY TAPES TELL TALES THAT 'TAIN'T TOO TRUE

Hold your fire! If you're about to fire away and are depending on your tank's recoil mechanism, better make sure that steel indicator tape on the replenisher is telling the truth. If it's broken, it could be lyin'.

HERE'S HOW TO DO IT





Make your normal check of recoil oil. Then take hold of the tape—easy does it—and try to pull it out of the replenisher. But no rough stuff.

There's no need to heave on that tape. The idea is to see if the tape is fast to the piston and not broken.

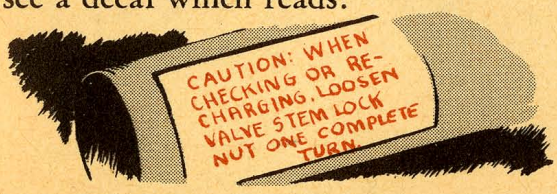
If the tape comes out when you pull on it gently, brother, you'd better hold your fire. You and your recoil mechanism can both get it if the recoil cylinder is empty—and it could be, even tho that dirty lyin' tape said the oil level was correct.

If you pull gently and find your readings are falsies, send a fast SOS to Ord.

WHEN A HELPING HAND HELPS

You as the gunner in an M47 tank can do your Ordnance maintenance buddies a big favor.

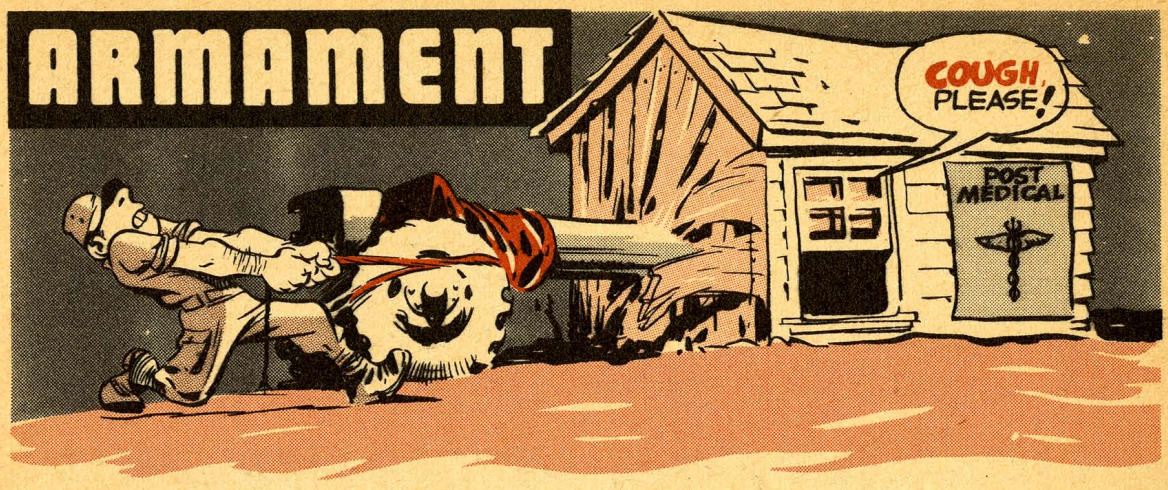
On the piston-type accumulator you'll see a decal which reads:



Your favor is to scratch out the "one" and make it read "three (3)" complete turns, or let Ordnance maintenance know you've a decal that needs changing.

Without this 3-complete-turn procedure an improper check of the charge of the accumulator might result.

If a charged accumulator is disassembled things will pop and somebody might get hurt.



NO SIDE-SLAP, PLEASE

Here's a reasonable explanation as to why certain Skysweeper gun crews are "hotshots" and don't get many duds. It's because they treat and handle their VT fuzes as gently as new-born babes—with nary a bit of side-slap for 'em.

If you drop or slam that VT fuze round into your Skysweeper's magazine you're liable to get a dud. Yessiree, there's a little glass vial in that fuze that isn't made to take side-slamming. So—handle her firmly but gently unless you want a dud, bud.

SKYSWEEPER GRIT

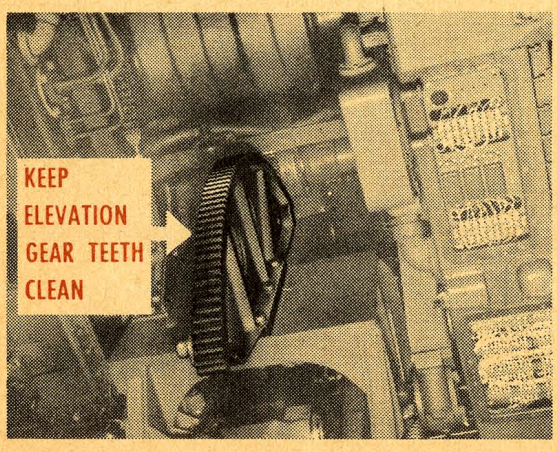
One way of making the Skysweeper (T38) live up to its name, is by keeping it clean, 'specially the elevation rack.

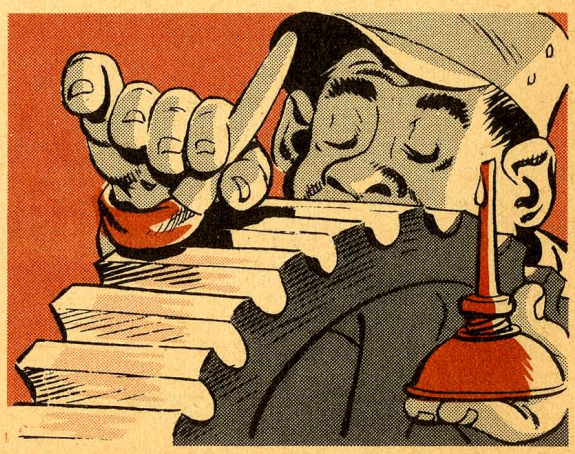
You'll miss the side of a barn if you let grit or dirt stay in the gear teeth.

Those gears are made to fit snug, and dirt'll cause wear and strain. Rough tracking in elevation could mean dirt on the rack. And accuracy is shot all to hell —instead of the target.

Keep a film of oil on exposed surfaces of elevation rack and pinion (like it says in LO 9-3026-1 and LO 9-3026-2) **except during operation.** But before firing the piece, all traces of grit, dust, and oil should be wiped off.

Your gear surfaces are covered with a hard, black oxide film which keeps them from rusting. **Never remove this finish.**





SOFT CAMS?

Have the breech lock cams on your .30-cal. M1919A6 machine guns been breaking? Then you better have your Ordnance unit check all you've got.

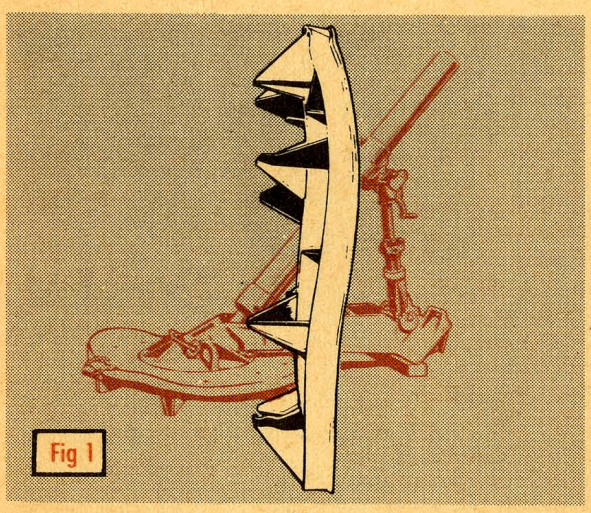
Some of the cams were made of a soft metal that breaks when the gun's fired. If the Ordnance guys find any of the soft babies, they can replace them with the right kind.

OUTER DONE IN

Dear Half-Mast,

The M24 mount's outer ring gets bent something terrible around here (Fig 1). After firing our M30 mortars only a few times, the outer rings look like they fell down the Grand Canyon. What I'd like to know is how do you straighten them out?

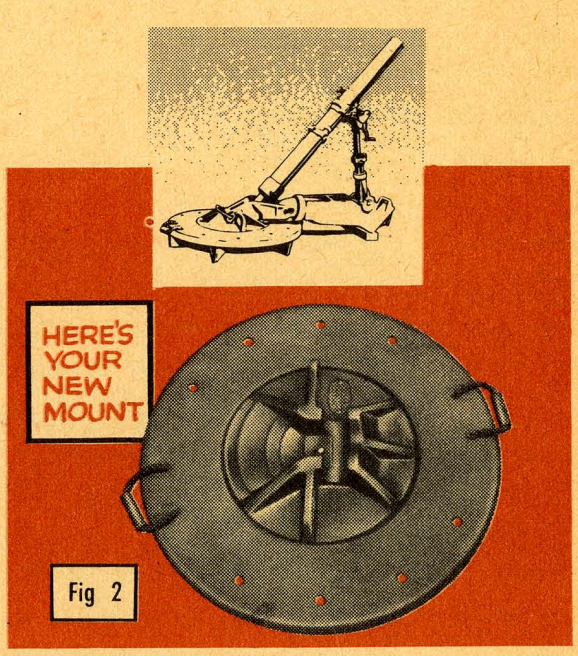
WOJG H. I. G.



Dear WOJG H. I. G.,

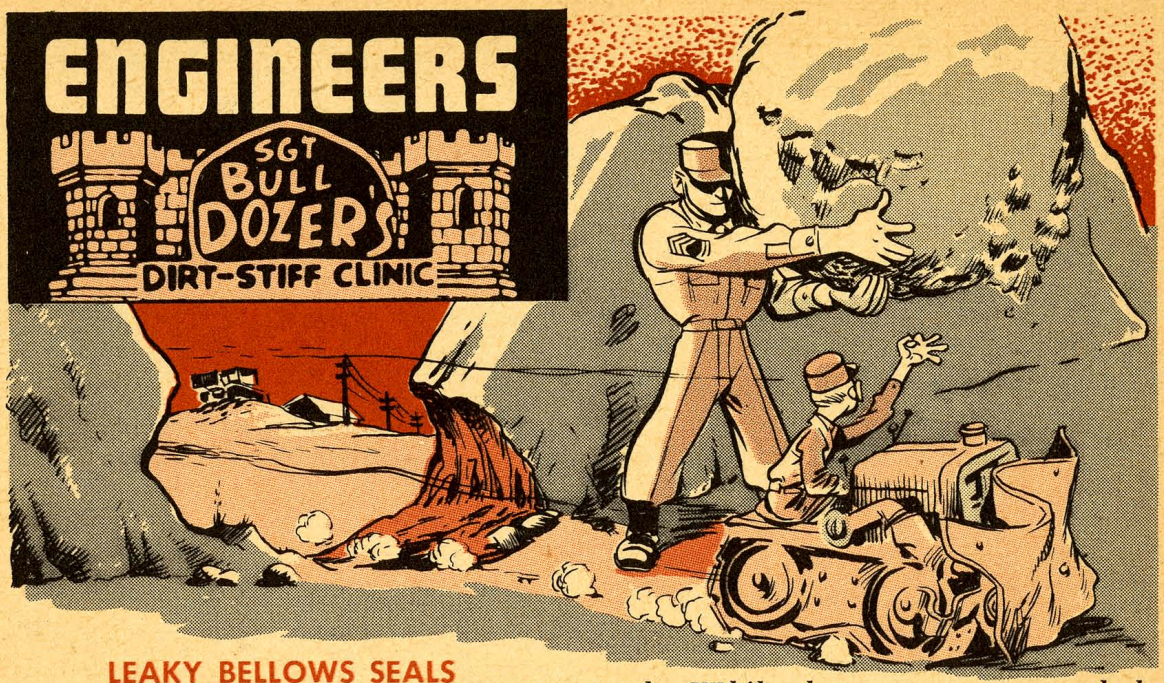
When your M24 mortar mount's outer ring gets bent, all you can do is hand it in for a new one. The job of making circles out of 'em is for Ordnance.

There's a new mount out called the M24A1. This model's a single unit, with no outer ring, and weighs 28 lbs less than the M24 2-piece job. Besides not bending like the old one, you'll find them easy handling (Fig 2).



But the two are interchangeable. So you're going to be issued M24's as long as they're in supply.

Half-Mast



LEAKY BELLOWS SEALS

Dear Sgt Dozer,

Leaky bellows seals have recently deadlined two of our D-8 Caterpillar tractors. Was wondering if it was just our stuff or if you'd heard of other D-8's with the same trouble.

Both tractors hit here about the same time and they've each got about 900 hours. Our equipment gets maintenance and operation by the book, and anyway we can't see how this difficulty can come from improper preventive maintenance.

The way the shop sees it, the damage could come from lack of regular maintenance while the equipment's sittin' in storage waiting to go to the user, or from defective parts or bad assembly.

Here's the score. Only one section of the seal assembly was found defective. Small dents and scratches were on the washer, and the corresponding section of the gasket looked lifeless and shrunk up.

Everyone's agreed that lack of lube could damage the seal in one section only. While the tractor was stored the seal was protected up to the lube level, and the section above the lube level was damaged.

If lack of maintenance is the answer, you can be sure other things will start going bad. Sure seems it would pay to have equipment operated, even for short periods, while it's in storage to make sure everything gets its fair share of lube. The practice would sure save the user a lot of headaches, to say nothing of savin' parts and man-hours.

W. C.

Dear W. C.,

From what you say looks like you hit the trouble right on the button. Supply depots schedule regular maintenance on equipment stored for issue, but I guess a piece can get skipped sometimes.

When you find this kind of trouble on equipment that's fresh from the supply depot, it's a good idea to let the depot people know about it right off.

The important thing at this point is to make sure your tractors are exercised frequently while standing in temporary storage in your outfit so those seals don't dry out and give you more trouble.

Bull Dozer

GOT A STRAY RECEPTACLE?

Dear Sgt Dozer,

We recently got some M1A1 40-mm antiaircraft guns mounted on carriage M2A3 with local control-system M22 and cable control-system M23. The power unit is a portable Kohler generator Model 5MH81 (Eng Stock No. 17-4780.525.500).

Here's our problem: Where's the receptacle to make the power-unit cable-system hook-up?

We've searched all equipment and accessories—as well as publications—and no soap. How can we make this connection?

Sgt N. O.

Dear Sgt N. O.,

A Modification Work Order, now in the mill, will soon give you the needed receptacle. Until MWO Eng 5-5081-1 hits the field, you'll have to rig a temporary hook-up. Here's how you do it:

Take off Connector D8208561 from 4-conductor Cable Assembly C8208559. If you have the waterproof connector which is molded right onto the cable, simply cut the cable about 2 feet from the connector.

Be sure to keep Connector D8208561 for reapplying to Cable Assembly C8208559 after Corps of Engineers generating sets have been modified.

Then you strip back about 18 inches of the rubber jacket on the 4-conductor cable. If necessary, strip each conductor so that 1 or 2 inches of the copper wire are exposed.

Make your load connections to the output terminals like this:

Color Coding (Free end of cable)	Connect to Phase	Generator Output
Red	A	T1
Black	B	T2
Green	C	T3
White	N	T0

See the 120-208-volt 3-phase terminal connection chart in Fig 5, TM 5-5081 (Apr 53) for a sure way to do it.

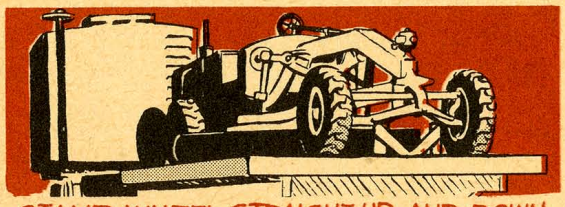
Bull Dozer

HOLD TIGHT

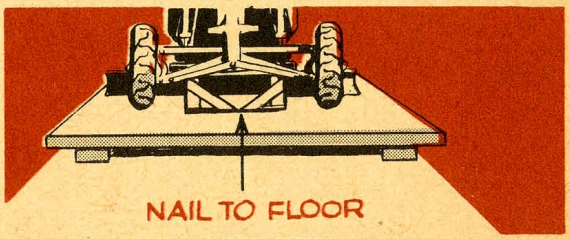
When you're shipping a motor grader from one job to another, block its leaning-wheels vertically and tight. Otherwise it won't make the grade. Unless the wheels are carefully blocked, those motor-patrols could reach their destination pigeon-toed or knock-kneed.

The roadmaker's front wheels are made to stand, or lean either left or right. That's why the vehicle can operate at any angle with its blade still slicing the cut you want. The leaning wheels also provide balance to the forward push of a slanted loaded blade. But to do that, its wheels must be parallel and adjustable. And a bad line-up'll also wear and tear the equipment—especially the tires.

The next time you ship a grader, be sure to secure its front wheels right. First stand the wheels in a straight up-and-down position. Then block both wheels by suspending them like it shows in Fig 1. You don't want them to tilt joggling along on bumpy railroad tracks or while changing partners with locomotives or riding on a trailer. Suspending them will help take the strain off the side-shift assembly that regulates the wheel's lean.



STAND WHEEL STRAIGHT UP-AND-DOWN



NAIL TO FLOOR

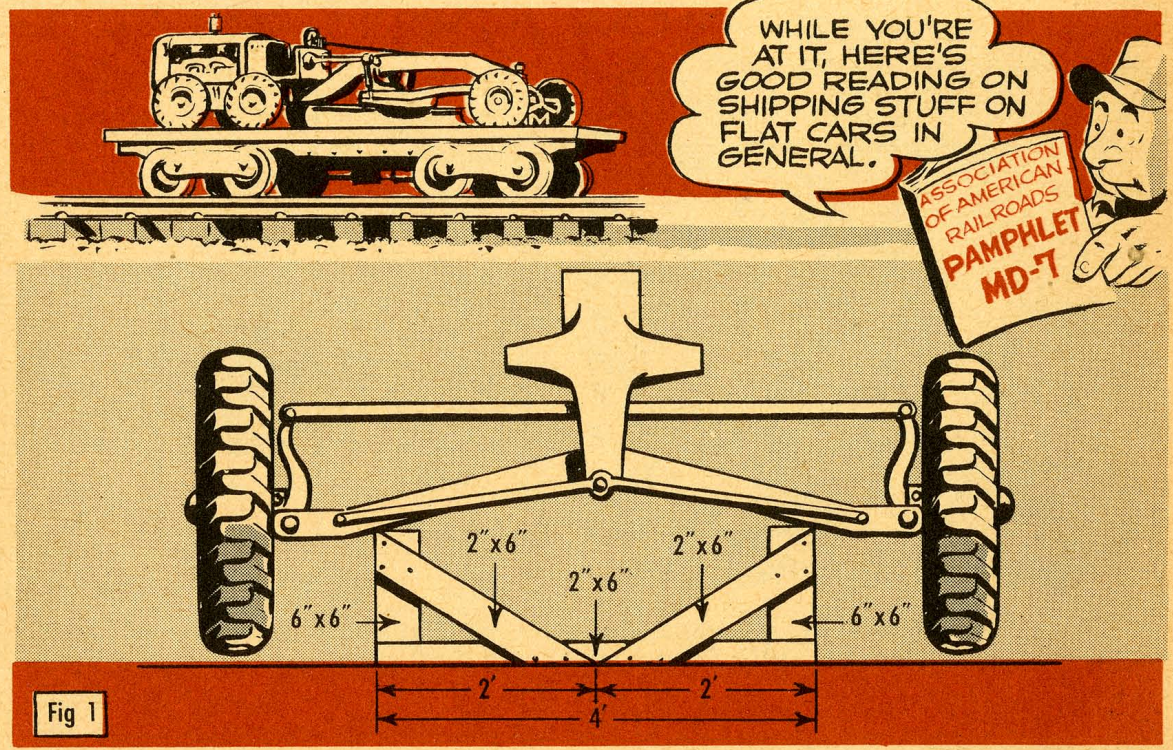
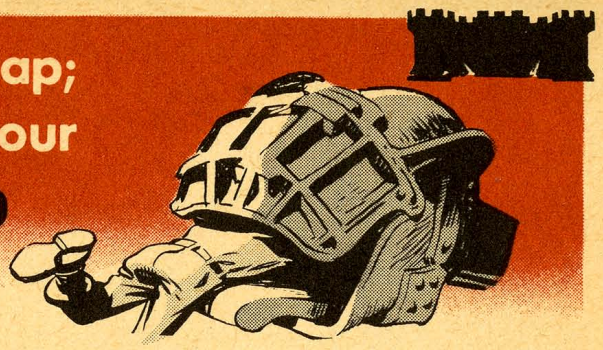


Fig 1

Close your shovel's yap; a sure way to keep your BOTTOMS UP



The way to make your dipper hold its own is to be sure its yapping door is kept shut tight. And to do that, you gotta keep its latch in working order. If you don't, it'll drop its load all over the place.

What usually gives, when a dipper's latch is slippery, is that the bar and latch-keeper's insert are rounded from wear. It takes a sharp corner on each to clamp the door closed until you're ready for tipping.

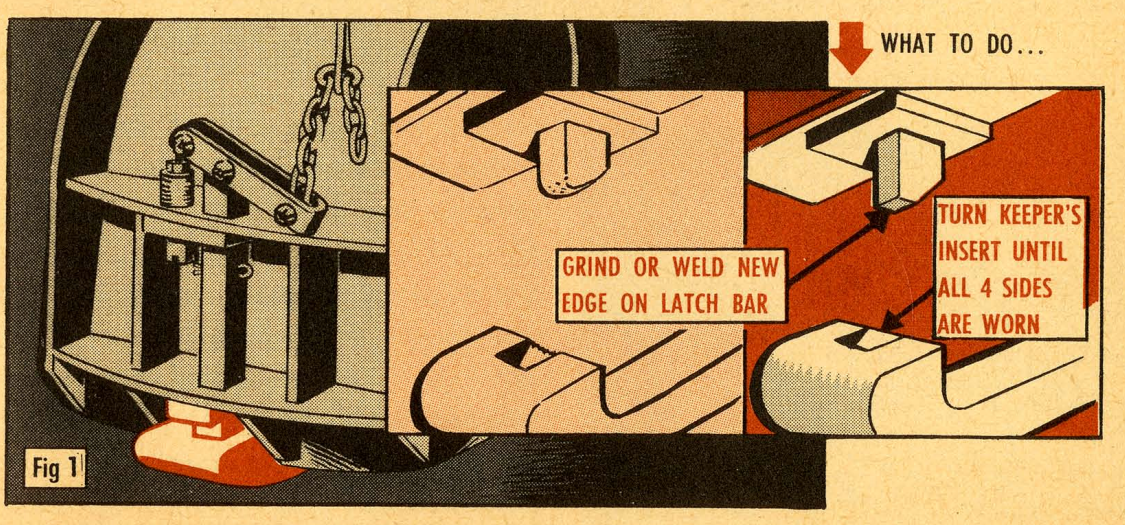
To come up with a 90° angle on the insert, drive it from the latch-keeper and turn it around. You can switch this insert four ways for four different right angles. Which makes one insert last a long time. Then, when you've worn out all angles, replace it with a new one.

Be sure you peen the keeper's top and bottom around the insert to hold it tightly in place.

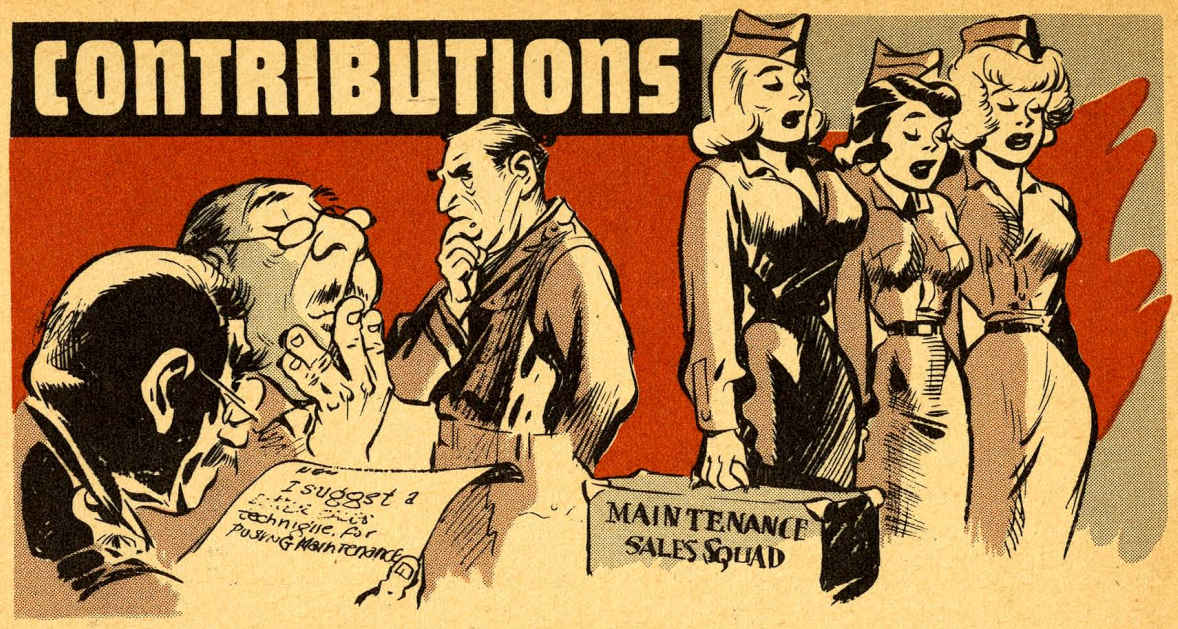
Now for the latch bar. To put new life into the bar's worn tip, grind it down about ⅜ inch to the shape shown by the dotted lines in Fig 1. And when it gets too short to hold, lower the bar further into the keeper by adjusting the fulcrum bolt.

On the Bucyrus-Erie dipper, the bolt carries washers which can be moved from the bucket-rib's top side to its lower side until you get the adjustment you want. The best adjustment is where the bar drops into the keeper less than ½ inch. That much hold will allow you to tip the heaviest dipper load quick and easy like.

With good working latches, you'll find dippers keep well loaded with bottoms up.



CONTRIBUTIONS



QUICK CHECK STUNT

Dear Editor,

Here is a stunt for determining electric air-gage accuracy and cut in and unloading pressures on all vehicles with air equipment.

Make up a test gage using Coupling (half), air brake, assy. (BW-212953) with a reducer and an air gage of 150- to 220-PSI capacity (Fig. 1).

By snapping this on the right rear truck outlet (opening the valve, of course) the above mentioned components can be quickly checked.

Mr. D. Thompson
USMA, West Point, New York

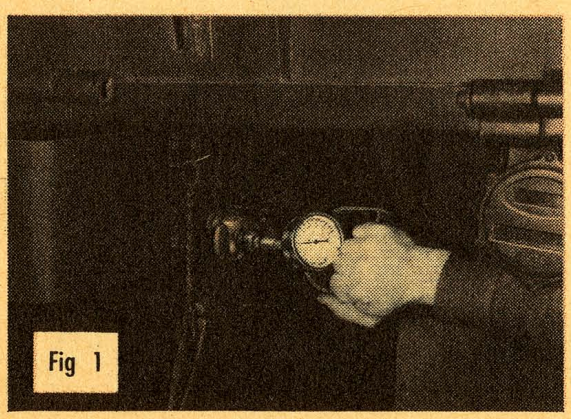
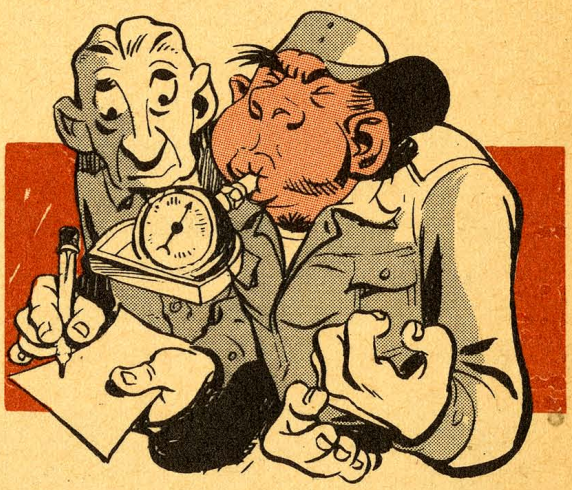


Fig 1

(Ed Note—Your suggestion works fine. However, a motor pool at Ft Belvoir has come up with an even easier way to do it. They take the engine compression



gage from the second-echelon kit and shove it into the brake hose coupling, turn on the valve and read the gage. Only difference is that this method does not involve any special fittings and does not tie up one brake hose coupling. Since you have a rubber cone on the compression gage fitting into the rubber washer on the brake coupling, you don't lose any air pressure.)

EASY MARK

Dear Editor,

We've got an idea which will make checking the ignition-timing on military vehicles easier, quicker and safer.

On any truck, turn over the engine by hand until the factory ignition timing-marks are exactly alined. (Doesn't matter if they are on the flywheel or on the crankshaft pulley.)

Now go to the crankshaft pulley, down in front of the truck, and put a

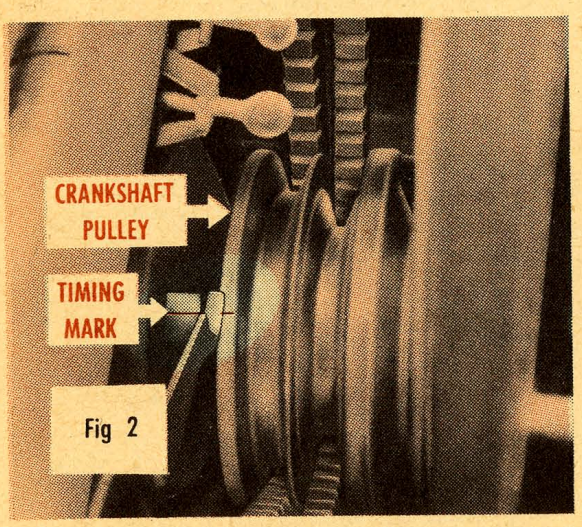


Fig 2

thin white line on it. This line can be either straight down or straight across, depending on what you can find on that truck. Continue the white line off the pulley onto some fixed part of the engine or frame (Fig 2).

Now for a quick timing check, you attach your timing-light and run it down beside the engine and out the front bottom. Start the engine with the light connected to No. 1 plug and direct the flash onto the front pulley. If the white line appears straight and unbroken, your time setting is OK.

This method is quicker, once the line is put on. It'll also keep your light and hands out of a fast fan. On flywheel-timed engines, you don't have to remove the flywheel-cover.

A. M. Peters
Ft Bragg, North Carolina

(*Ed Note—Quite right, Mr. Pete, and since timing by a mark is at best a sort of guide, this method will be accurate enough.*)

LOOSE POCKETS CAUSE TROUBLE

Dear Editor,

The cross bows on the M104, 1½-ton cargo trailer don't go down into the stake pockets very far and, to top it off, the pockets are open down one side.

When you use the canvas over the bows, the weight of the canvas tends to pull the bows toward the center of the trailer. With the bows pulling on those split pockets, the pockets spread apart and the bows wobble all over the place.

I got some metal about the same gage as that used on the bows and cut ten pieces out of it about 1¼ inches wide and 3¾ inches long. I had the pieces welded over the open side of the pocket (Fig 3). With this reinforcement on the pockets we don't have a sloppy looking trailer and we don't have to worry about straightening the pockets every time we use them.

CWO Paul J. Miller
APO 46, New York

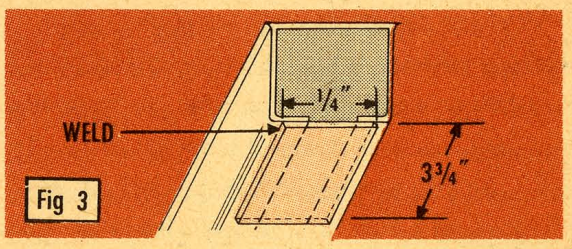
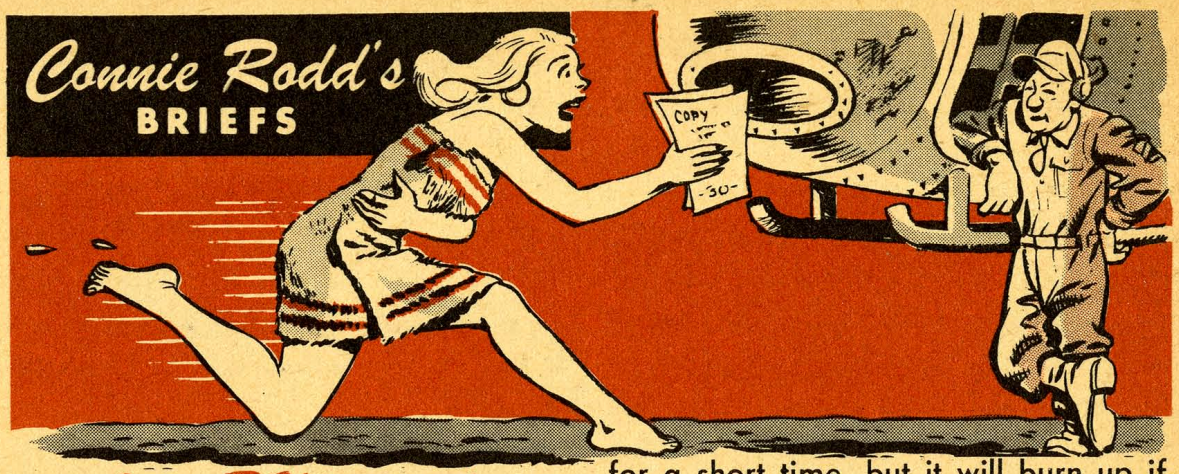


Fig 3



Jeep TM switch

Here's the straight dope on Table III of TM 9-804A (July 52): The 1000-mile and 6000-mile services are a little switched. The first column should read "D" instead of "B" and "6000 miles or 6 months" instead of "1000 miles or 60 days." Then, the second column ought to say "1000 miles" instead of "6000 miles or 6 months." Then you can get up and fly right with your M38A1. The revised TM will give the right dope.

Here's that soda

Been wondering how you get that soda for cleaning your batteries? Here y'are: Sodium Bicarbonate, technical grade, Chem Stock No. 116046. You mix a half pound per gallon of water. You'll find it in SB 9-4. Also see TB Ord 557 (26 Mar 54).

Booster switch

Once more, leave us say it again: When starting any vehicle in the medium and light tank families, do not hold the booster switch down for more than 30 seconds at a time. That booster coil is designed to give with an awful wallop for a short time, but it will burn up if you run it continuously.

Foul ball

Man-oh-man! That turret floor latch safety-spring deal we told you about on page 914 in PS 20 sure tossed you a curve. It was really a foul tip—telling you to try it on the M48. What it meant to say was M47—47—47—47—not 48.

Slip it in easy

Your M41 tank power pack, that is. When you take this pack out, you leave the inlet elbows attached to the carburetors, and the air hoses slip right off. Putting it back is a different story, and you'll save lots of grief and woe if you take the elbows off the carburetors and slip them into the air hoses first, then drop them back over the carburetor studs and bolt up. Try it.

Keep the dirt outside

Oil in your M135 transmission has enough normal dirt and grit to scavenge without adding more to its job. Wipe the cap and top of the filler tube with a clean rag before you pull out the dipstick. And watch where you lay that dipstick. If you

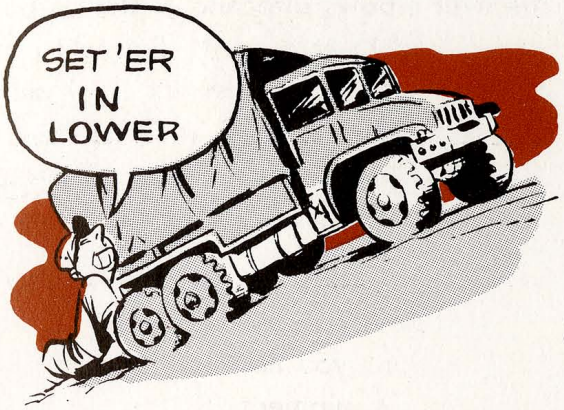
have to dump in some oil, use clean oil that's in a clean container.

A sneaker

A sneaker snuck into LO 9-8028 (Nov 53) for the hydraulic dump-body reservoir on your 5-ton M51 dump. What Note 15 meant to say was this: Weekly remove filler plug and screen. Replenish with oil to **third mark** from the top on the gage with the body **down**. LO 9-8028 (Nov 53) is being revised.

It's a load

Here's one to keep on the tip of your brain—when you're driving any of the heavy shop trucks, like the M109 or the M535, 2½-ton 6x6 f'rinstance. You gotta remember that the shop body and equipment is a real load. You need a growler to start'cha rollin', so use second gear high-range or lower even on the best of spots. And drop to low range if the going's tough—saves clutches.

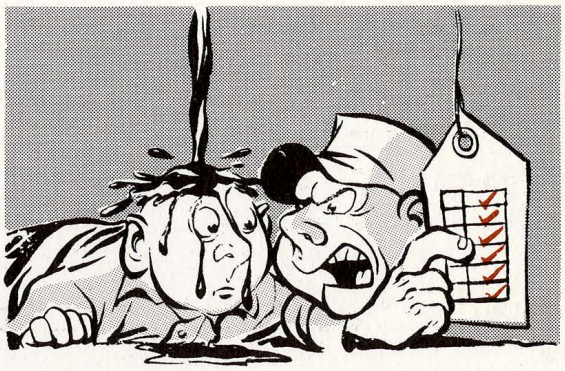


Jeep rattles

Here's a trick that'll keep your M38's hood from rattling like a bucket of bolts. Remove the hood-hinge pin—pinch both hinge sections together (very slightly). Then grease the pin and slip it home. If the pin's in bad shape and can't be reused, get a new one (Ord Stock No. G740-7697481) from your Ordnance support unit.

Look before draining

Check the processing tag on your new truck. If it says the engine contains break-in oil—that's good for 500 miles. Check it but don't change it for the first 500 miles. Your engine needs that break-in period.



Plug gets a boss

A blind-tapped boss has been added to the flywheel housing of the M34 and M35 2½-tonners. When not fording this boss'll hold your flywheel-housing drain-plug in safe keeping. You'll find it on vehicles with serial number beginning at 127355.

On the way

If you've got one of those early M43 ambulances, with the driver's door barred by the spare-wheel carrier, sit tight. An MWO is on the way to replace the barrier with a swinging carrier—like on the later ambulances. Keep in touch with your Ordnance support unit about it.

TOO LATE?
MOST Vehicles Have a Manufacturer's Warranty
It's Your Guarantee for trouble-free operation.
USE IT BEFORE IT EXPIRES
The limit is generally one year or 4000 miles, whichever comes first.
A UER (DA FORM 468) Does the Trick
The Manufacturer exchanges defective parts free during this period.
(See SB 9-98 SERIES)